COAL AGE

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That These Men Shall Not Die in Vain

BY R. DAWSON HALL

THE terrible loss of life in the Baltimore Tunnel must not be allowed to be forgotten till all the important lessons that it has taught have been driven home. Admittedly the law in the anthracite region, as far as the transportation of explosives is concerned, is wholly inadequate. The coal company that operated the tunnel tried to make up for that defect, but the men, finding the cure involved them in much trying labor, demurred. As a result there was a compromise, and the company devised a plan with the union which would have prevented the accident in question had it been adhered to.

One of the Cars After the Explosion, Showing Powder Kegs and Dinner Pails.

The powder was always to be hauled in the rear car of a long trip, and an empty car was to separate it from the cars conveying the men. The union was to be responsible for the execution of the order. Unfortunately the grievance committee, which represented the union at the mine, allowed the men to violate the agreement, and the accident happened.

Men like to keep their kegs of powder in their own possession. They do not like to deposit them in a car trailing some distance behind, for there is always a risk of theft. On the other hand, they can only with difficulty be induced to carry them two or three miles to the working face. When they do that they must lug their tools and dinner pails also, for they will not trust their equipment on the trip without being there to watch it.

Though, in the Baltimore Tunnel disaster, the powder in the rear car did not burn or explode, yet there is always just that risk where powder is hauled by an electric locomotive, even when it is placed in the last car of a long trip, unless the powder is carried in a properly insulated box. This for other reasons should be lidded and locked, and in care of an attendant with an electric light in his cap. It may not be necessary to follow the Illinois law and place the explosive near the working places in the interval between shotfiring and the entrance of the day shift, while the current is turned off on the roadways along which the explosives are hauled, but it is necessary that the powder be hauled in a dry and nonconducting box to which sparks and lights cannot have access.

The Illinois plan has some advantages, but there will be danger nevertheless if powder is stored in the mine and distributed in the presence of a lot of excited miners, with lights on their caps, who are anxious to get to work; and more dangerous yet, if there is no one on hand to do the distributing.

Every state should scan its mine laws with care to discover defects that may make a recurrence of a disaster like that at the Baltimore Tunnel possible. In few bituminous mines could it have occurred without stirring up the coal dust and causing a violent explosion.

Sealing Up Old or Abandoned Workings in Gaseous Mines*

The Good or Bad Effects of Sealing Off Worked-out Portions of a Mine Have Never Been Definitely Agreed Upon. The Proper Ventilation of Such Places Is Difficult. A Method of Procedure That Is Neither Difficult nor Dangerous Is Outlined

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THE advantage of sealing up old workings in fiery or gaseous mines is a subject that has received but scant attention among mining men. It is true, however, that every once in a while this matter is raised without any definite conclusion being arrived at or any system being suggested. I think the reason for this is obvious and arises from the fact that it has been dealt with as a matter of personal opinion and in consequence was a subject that could not be argued to a logical conclusion.

Neither have the tremendous possibilities and dangers arising from the extensive working of deep beds generating large quantities of methane presented themselves to men's minds, inasmuch as they had until quite recently only mined in the shallow measures, where little or no gas of this kind was generated. In some instances what deep mines were in operation had not been extensively developed, and therefore the need for intelligent precautions had not become obvious. Today conditions are different, and we stand face to face with an important and serious situation; consequently, it becomes our duty as thinking individuals to put aside all matters of personal opinion and deal with this question as becomes men who realize that the subject is one fraught with the greatest possibilities in regard to the safety of human life and limb, the protection of property and the successful recovery of a valuable mineral for the benefit of the nation.

IT WOULD seem that the chief arguments of those who are opposed to the system of sealing off old or abandoned works may be summed up in one sentence: Is it not better to ventilate old works, and keep the gas out, than to seal them up and allow the gas to accumulate behind the seals? To this question the amateur would probably answer, Yes.

But the experienced and observing mining man would likely say, "Yes, if this can be done." It must be realized that this is not fully accomplished, and as the works become more extensive the difficulties increase, and as they grow still more extended, it will ultimately become a physical impossibility to seal them effectively.

To illustrate: Suppose you have an extensive area to work, say, the cross-entries have a mile and a half to go from the main entry to the boundary line. This would give 7920 ft.; and if the panels were 420 ft. between each pair, this would give a 200-ft. room with a 20-ft. barrier between panels. This would mean 15 pairs of panels on each side of the cross-entry. Suppose that it was intended to have 14 rooms on each panel; the panel entries are 10 ft. wide and the coal 8 ft. high, the rooms 25 ft. wide on 50-ft. centers and 200 ft. deep. Then, when this pair of panels was finished, there would be a space of over 1¼ million cubic feet. This, if not properly ventilated, would fill up with deleterious gases, chief among which would be methane.

Now, consider what the position will be when there are, say, ten pairs of panels finished. Take those panels on the intake aircourse side. It would be necessary to install some sort of regulating door across the aircourse to force the air into these panels, or they would not be ventilated. This would have to be done with every pair of panels; and, provided there was available a reserve of ventilating power to make this possible, do you believe that any intelligent and experienced man would or could take the responsibility of asserting that this air, affected as it would be by the transpiration of the various occluded gases, would be fit to sustain health and life? Certainly not.

AGAIN, it must not be forgotten that it would be necessary to have some means of forcing air into the panels on the return side. This would mean an overcast or air crossing over the haulage road from the intake air-course, or a door on the haulage road. Such a crossing would have to be made for each pair of panels. When all this is done, what condition do you suppose the air would be in on the inby side of this, where the miners all have to work? It would certainly not be an atmosphere that contained a reasonable amount of pure oxygen.

Yet, again, it must be remembered that the stoppings between the entries would probably decay in a comparatively short period; certainly some of them in less time than that represented by the life of such a district. When this occurs all the area on the inside of that point would be unventilated and would fill up with gas. A sudden fall then occurring might force out thousands of cubic feet of methane. This would be carried by the air current to the first open light or even the trolley wire with the motor coming along. And then, well, may God in His mercy help those that were there!

The question quite naturally arises: What method should be adopted in sealing off panels? I am of the opinion that there is only one distinct method that can be adopted with success and a fair guarantee of safety, and that is, when the first pair of panels in a district is finished, leave them open and ventilate them until the second pair is finished and the third pair started; then seal up the first pair. When the third pair is finished, seal up the second pair, and so on, always taking care that the pair of panels on the inside of the pair

*Paper entitled "Advantage or Disadvantage of Sealing Up Old or Abandoned Workings in Mines Generating Methane," presented before the annual meeting of the Illinois Mining Institute, May 23, 1919.

next to be sealed is finished. It will readily be seen that this method offers the best guarantee of safety against inadvertently holing into a confined body of gas pent up behind the seals.

On the other hand, if the first pair were sealed up as soon as finished, there would be a possibility of holing some room from the second pair into the first pair, with serious consequences.

The question has been asked, What kind of gas would exist behind the seals and what condition might it be expected to be in? To answer this it is necessary to call attention to the condition in which the gas exists *in situ*. One scientist has asserted that it must exist *in situ* in the form of a perfect gas. Such a condition, however, is difficult to comprehend as it suggests the existence of something that is a tangible substance yet occupies no space.

However, we do know something about occluded gases. A gas is occluded—that is "hidden"—when it exists in the pores of a solid substance. A familiar example of the occlusion of gases is found in the coal beds, where gases often exist in large quantities and are a source of danger in mining.

The conditions that have held these gases in the coal and adjoining strata till set free by the penetration of mine workings are largely a close coal and an impervious roof and floor. The gases most commonly occluded in coal beds are methane, nitrogen, carbon dioxide, carbon monoxide and some other hydrocarbons. The relative percentages vary largely in different localities and even to a considerable extent in freshly mined coals.

THE pressure of occluded gases has been shown by a number of experiments in England, France and Belgium to reach as high as 250 lb. to the square inch. Whatever degree of exactness these experiments may have they serve to show at least the enormous pressure under which occluded gases may be projected from a newly exposed face of coal.

The term "transpiration" as here used relates to the more or less steady outflow of occluded gases from the pores of the coal. It has been found by experiment that the velocity of transpiration, like the velocity of diffusion, is different for different gases subjected to the same pressure. However, it has been demonstrated that the velocity of transpiration, unlike that of diffusion, is independent of the density of the gas.

The rate of transpiration of the different gases occluded in the coal has an important effect in determining the character of the gaseous mixtures issuing from the seam and consequently the gaseous condition of the mine.

The more rapid transpiration of the hydrocarbon gases such as methane or firedamp and ethylene tends to increase the percentage of these gases in the mine air, while the percentage of carbon dioxide and nitrogen which are always present to some extent in the coal is decreased owing to the same cause. In some coals methane has been shown to form 93 per cent. of the occluded gases. In others nitrogen and carbon dioxide have formed 54 per cent. Oxygen rarely exceeds 4 or 5 per cent.

Once we clearly comprehend how the transpiration of gases proceeds under ordinary conditions, we are better able to understand what would be likely to take place behind the seals. It is true that some of the opponents of this method have suggested that the gases behind the seals might reach a high pressure and possibly cause a sudden outburst of gas. This, however, is a remote possibility, if it is possible at all.

It must be remembered that the pressure of the occluded gases has already been much reduced during the working process, and the increased pressure of those gases still pent up behind the seals would further retard the transpiration of those yet occluded, until it is probable that transpiration would cease.

Again, we must remember that the gases behind the seals should be much less dangerous than those accumulating in old workings where the mouths of the entries are open to the atmosphere, because where the entries are thus open the gases diffuse with the oxygen of the atmosphere, while those behind the seals have practically no oxygen but will be mixed with some of the other occluded gases.

To my mind all the evidence and possibilities are in favor of the method of sealing off old or abandoned workings. Such a procedure would insure a more healthful atmosphere for miners to work in and increase their efficiency; it would afford an almost incalculable safeguard to property and reduce the danger to human life and limb to an extent that would reflect credit to the mining industry.

In conclusion, I wish to state that the members of the Department of Mines and Minerals of Illinois, which includes the inspectors, has no desire or intention of being arbitrary, neither do they wish to dictate their opinions to others. They are anxious, however, to impart to others their ideas and knowledge of known natural laws which experience has taught them, with the hope that all may coöperate and help to reduce the risks of a hazardous occupation. We may all thus do our duty to our fellowman, to the state and to our country.

Health in Its Relation to Industry

Large organizations are beginning to realize what every employer of labor must sooner or later learn: that the success of an industry lies in the health of its workers. Given an incentive, every workingman will labor to his maximum endeavors. But your worker, first of all, must be sound physically and morally in order to be of value as an industrial unit. Just what has been accomplished in the way of health insurance and disease preventive measures, and its effect on the industries in which the plans are being operated successfully, is admirably set forth in an article headed "Health and Industry," by Floyd W. Parsons, in the June 7 issue of the *Saturday Evening Post*. It would repay every coal-mine executive to read this article. In passing, it may be mentioned that Mr. Parsons, who as the former editor of *Coal Age* needs no introduction to the coal-mining world, will shortly start his Science and Industry Department in the *Saturday Evening Post* as a regular feature of that periodical, the editorial staff of which he is now a member.

MOST OF the coals received by the Bureau of Mines came in barrel-lot shipments for test in small low pressure boilers; therefore, domestic rather than steam sizes predominated. To determine the weight per cubic foot, the coal was shoveled loosely into a box measuring 2 x 2 x 2 ft. inside and the coal was leveled off with a straight-edge.

Interesting Summer Sessions of Three Coal-Mining Institutes

By R. Dawson Hall
Managing Editor, *Coal Age*

A description of the summer sessions of three lively state institutes, one held on the Mississippi River between St. Louis, Ill., and Kenova, Mo., another at Huntington, W. Va., and a third at Lexington, Ky.

Institute De Luxe in Illinois

TO S. T. JENKINS and his committee of arrangements in the Illinois Mining Institute must be credited the extremely favorable circumstances under which the institute met. A boat was chartered, the "Golden Eagle," and, for two days and a half the institute traveled the waters of the Mississippi from St. Louis, Mo., to Quincy, Ill., thence to Keokuk, Mo., and back to St. Louis. Many of the participants enjoyed the affair so well that they stayed up all night so as not to shorten the pleasure unnecessarily by anything so prosaic as sleep.

The boat left St. Louis on Thursday, May 22, with 96 members aboard, and on its cruise to Quincy read and discussed two papers, one on "Power Transmission Methods in and Around Coal Mines," by S. W. Farnham, and the other on "What Constitutes a Proper and Lawful Examination of a Mine by a Mine Examiner," Steve Gosnell, of Holidayboro, Ill., being the exponent. The number in attendance constituted a full capacity load for the good ship "Golden Eagle," when captain, pilots, bandsmen, cooks and waiters were taken into account.

The boat turned her paddles so industriously that despite the unusually high river she bade fair to get to Quincy ahead of time. So the boat was stopped for an hour and a half and one of the papers read in the silence resulting, for it must be remembered that a river boat does not fail to give evidence of its progress in sundry creakings and paddle noises such as make speechmaking a trifle labored and hearing a little difficult.

The boat arrived at Quincy at 10 a.m., and the Quincy Chamber of Commerce was on hand to take the members over the pretty town and through a seemingly endless chain of parks, beginning with the 275-acre park surrounding the State Soldiers' and Sailors' Home, where 2000 veterans and their wives are pleasantly passing their declining years. Quincy boasts of the following parks: Parker Heights, Gardner Park, Sunset Hill, Riverview, Edgewater, Indian Mounds Park and South Park. There are so many trees that from the heights the city looks more like a wood than a town of 36,000 inhabitants.

After a short session at the Chamber of Commerce, where the members were welcomed as guests of the city of Quincy, they returned to the boat, which slipped cable and stood for Keokuk, Mo. In the afternoon a session was held with the paper of Joseph C. Thompson as the subject of discussion. This contribution appears on page 1110 of this issue. It is entitled "Should the Abandoned Workings of a Gassy Mine Be Sealed or Ventilated?" There was no adverse opinion, everyone agreeing that Illinois mines at least should always seal off their abandoned workings. The dangers of mine fires in the old gobs make this practice more necessary in Illinois than elsewhere.

Now that hostilities are ended, the institutes revive their activities and prove more active than ever before. The Illinois men met on the Mississippi River, in a well-equipped river steamer, and the Kentucky men revived most successfully their first-aid contests. The West Virginia managers discussed with ardor the problem as to the possibilities of coal conservation in the Kanawha and New River fields.

Another condition in Illinois which makes sealing more necessary than elsewhere is the practice of leaving pillars of such a size that they will sustain the roof over old workings. As a result, large areas remain open in such a degree that they can give off gas. The surface property is worth more than the coal, and the coal companies in general do not own the surface. When that surface is cracked or waters removed (even where the waters have been an annoyance and not an assistance) the juries of Illinois have habitually given awards to landowners far in excess of the value of the land. Consequently coal operators have had to leave much mineral to sustain the surface. That being so, the areas are not self-sealing in any way, but nevertheless the condition of the abandoned workings soon becomes such that these workings cannot be traveled and adequately ventilated. Sealing is the only alternative and it should be done soon—before fire invades the pillars.

It was pointed out that a large part of the gas where it did not come from the roof was emitted not from the ribs of a mine but from the coal face and from the coal broken by cutting, blasting and loading. When the coal was not disturbed it ceased to give out any large volume of gas. Any sealed area, it was said, soon had an excess of carbon dioxide and a depletion of oxygen. When properly sealed it did not gain pressure as time passed; in fact, as Mr. Needham pointed out, the pressure was as often negative as positive. The ribs actually absorb oxygen and probably turn it to carbon dioxide and water or else occlude the oxygen in their porous structure.

Mr. Needham remarked that in western mines where there were heavy bumps he had sealed off many levels and left observation holes in the stoppings which he could open and close at will. On removing the plugs the mine examiner found that, at times, the holes inspired air and at other times expired the atmosphere of the gob. He added that while a cap could be obtained near the mouth of an expiring hole, the gas was not of such a quantity that a cap could be obtained in the entry near the stopping. Moreover, he added, falls of rock did not seem to increase the flow of air from the holes even when these falls were severe.

Drilling abandoned areas from the surface was also considered by some speakers. Some have put a mercury seal on such openings so that they would discharge the excess air, if the pressure became excessive, and a seal of this kind was suggested for use with the holes provided in stoppings, but no one seemed to think such mercury seals necessary in view of the small excess of pressure in a sealed area above the normal pressure of the atmosphere. One member suggested that a more profitable subject for discussion was where stoppings should be placed in the sealed area and of what materials they should consist.

The boat reached Keokuk in schedule time and, passing the city, went up to the dock and landed its passengers for a view of the great power house and dam of the Mississippi River Power Co. The dam is 4278 ft. long, not including in this the east abutment of 290 ft. and the west abutment of 81 ft. Altogether it measures 4649 ft., or 88-hundredths of a mile. Its width is

29 ft. at the top and 42 ft. at the bottom. Its height is 53 ft. There are 119 arched spans of 30 ft. with 6-ft. piers between.

The power house is almost exactly a third of a mile long (the actual figure is 1718 ft. instead of 1760 ft., which constitutes a third part of one mile). Its width is 132 ft. 10 in. and total height 177 ft. 6 in. There are 15 power units, each consisting of one 10,000-hp. turbine with an overload capacity of 13,500 hp., an hydraulic chamber having four intakes converging on a scroll chamber 39 ft. in diameter and an electric generator of a capacity of 7500 kw., generating 25-cycle, three-phase 11,000-volt alternating current, which is stepped up to 110,000 volts for transmission.

After the party had visited the power house it was taken by the automobiles of Keokuk citizens through the town and surrounding country, including the grounds of E. I. Dupont de Nemours & Co. Returning to the landing the regular addresses of welcome and of thanks were given in good measure. Having had a chance to sample the hospitality and to visit the town, the guests were well equipped to express their appreciation, so if the welcome was belated, the response was in good season.

In the morning all hands turned to the disposal of the remainder of the program. The first paper read was one by T. H. Tracy entitled "Know Your Battery Better." It has appeared already on page 1036 of the issue of June 5. The discussion was quite animated.

The following statement in the paper was traversed quite severely, but without budging the author from his position: "Operating instructors for storage batteries say little about discharging. As a matter of fact, a battery may, without injury to the plates, be discharged at any rate of current that it will deliver. There has been a widespread opinion that high rates of discharge are detrimental to the life of a battery. I can find no justification for this opinion with modern storage batteries."

It was said that too rapid a discharge was apt to cause undue heating and that discharge rates should accordingly be kept down, but the author, while admitting this, declared that it was unlikely, under any condition of operation, that there would be any such excessive temperature. There is a limit to the energy in a storage battery. If a battery is used in such a manner as to draw so rapidly on its capacity as to unduly heat it, it will lose energy so fast that it will be no longer capable of an excessive output. Thus the battery will protect itself from overheating. Its own limited energy will prevent excessive temperatures.

The character of water to use in batteries was also discussed. One speaker said that practically the only safe water to use was that which had been distilled. The water from the Great Lakes would serve the purpose, but in 95 per cent. of the places one could not feel safe without an analysis.

A representative of the Edison Company remarked that many of the statements in the paper about lead batteries applied quite closely to the Edison batteries. The voltage of the Edison cell was somewhat lower, namely 1.2 volts per cell. In consequence it was necessary to have more cells. The change in gravity of the electrolyte was practically nil. There was some change in specific gravity, this, however, being due not to discharging and charging but to evaporation.

The Edison cell is not affected adversely by a total discharge, this being in marked contrast to the lead battery which should not be allowed to part with more than a certain amount of its stored energy. Lights should not be permitted where Edison batteries are charged, for these batteries liberate explosive gas just as does the lead battery. The Edison people recommend that, in charging, the attendant keep the temperature below 110 deg. F., but where the temperature of the cells on commencing the charge is already high, this is sometimes difficult and all that can be asked is that care be taken not to exceed 110 deg. by any unnecessary margin.

For charging the storage batteries it was stated that the charging panel was the cheaper to provide, but a motor generator set is more economical in the long run though more expensive in first cost. With a simple charging panel the voltage is uncertain, and the results are not of the best.

In place of Martin Bolt, H. M. Wilson, director of the Department of Inspection and Safety of the Associated Companies, made a short address on industrial democracy. It was decided by the meeting to hold the next session of the Illinois Mining Institute in Springfield, Ill., on the third Saturday in November (Nov. 15). The officers of the institute were continued in office till that date. Many encomiums were tendered the committee of arrangements and the citizens of Quincy and Keokuk.

The secretary announced that contributions aggregating $3005 had been received from coal and supply companies. Other donations are expected. As the mining institute does not publish proceedings it does not have much need for money, and the funds on hand are now quite large. The expenses of the institute in the river excursion were largely, if not entirely, met by the fares collected from the participants. The fund now provided will enable the institute to arrange in the future for the perpetuation of their proceedings.

A superintendent should worry less about what he does not have and make more of what he does have in the way of available human equipment. In any good country good citizens are more numerous than bad. Every superintendent can bank on the support and fair dealing of most of his men if he can only avoid that common habit of seeing only the grouches of the grouchy while overlooking the smiles of the good-natured, thus embittering those who are most ready to stand by him.

West Virginia Coal Mining Institute

THE twentieth semi-annual meeting of the West Virginia Coal Mining Institute was held on June 3 and 4 in the Frederick Hotel, Huntington, W. Va., the genial Josiah Keely being in the chair. I. J. Harshbarger, the mayor of the city, welcomed the members present, and then the institute, in the person of its president and vice presidents, began to look over the session in the well-recognized disparaging way which institutes affect, despite the fact that the number present was larger than usual. When will institutes cease looking at themselves in the glass like a vain but freckled girl of sweet sixteen? Too much time is devoted to this uninteresting job. Let the president and secretary do their work and leave the rest to fortune. So much introspection wastes time and spoils the pleasure and value of the meeting.

In the absence of Floyd W. Parsons, R. Dawson Hall led the discussion on the Labor Situation with a few words of encouragement regarding the signs of the times, which are not nearly as menacing as some seem disposed to think. Only about 10 per cent. of any body of men in any industry are unreasonable. There is a reliable 90 per cent. of really good fellows, who, if they aren't already, will eventually make excellent American citizens. Vote they will or vote they do, and if we trust them to vote at the polls to direct everybody's affairs as well as their own, surely we can trust them when directing their own affairs.

True the 10 per cent. of evildoers are to be noted on every hand hard at work making trouble. We see them a hundred times as often as we see the reasonable men who do their work, put their dinner pails under the arms and go home quietly to their families. Like a sore thumb, the eye lights on the trouble maker every moment. We cannot see the 90 per cent., for they are

farther from the eye. As the physicist would say, "They subtend a smaller angle of vision." But the 90 per cent. are there, nevertheless, partly led by and partly resisting the aforesaid 10 per cent.

The operator can address himself to the 90 per cent. whereas the agitator has only 10 per cent. as his natural audience, and with a little diplomacy the operator, having all the advantage, should be able to get what he wants, if what he wants is right. His start is good if he does not anger or displease the members of the larger group, who will stand for fair play and sober measures, when real explanations are given to them as to what constitutes fair play and what measures are within reason.

The operator should, like a "movie" camera man, patiently turn aside the lens when the troublesome men place themselves before the rest for a "close up." He should take a view of the 90 per cent. behind. In none of his plans should he forget them. He should be patient with them that they may have patience with him. With the numbers on the operator's side he should never despair.

The logic of unchanged wages and hours was then presented by the speaker; and the power of a knowledge of facts to produce reasonable action by unions was shown by a reference to the known conservatism of men long engaged in union labors. They soon begin to see the facts and to become less radical. The man with the pick is apt to realize the problem inadequately and to think that the largest wage he can secure is fair to other workingmen and helpful to labor as a whole.

However, a little discussion will convince him that he must not demand of the workers in other industries an undue rate of pay, merely because coöperative bargaining, made powerful by the right to strike and the power to boycott, can secure him what he would like to obtain. The business of mankind is swapping services, and the labor of the miner is not worth twice as much as the labor of the bricklayer or carpenter who works an equal or longer time.

James A. Hall of the *Black Diamond* and Wightman D. Roberts of the *West Virginia Mining News* did not speak as scheduled, the first not being present and the second being present, but not in good health.

In the afternoon, in the absence of J. L. Thomas, president of the Carbon Fuel Co., a paper was read by his representative on the question, "Is There an Overproduction of Coal in America?" His answer to that question was that there is and always has been such an overproduction despite the increased demand. Coal output has always had to wait on car service. The coal industry has been unfailingly adequate when it had railroad cars enough to supply the demand for coal. According to the speaker, this was the case all through the war.

However, it must be confessed, there was a short period during which the railroads did outstrip the mines, but the mining plants at that time were producing more than the country could use because they were trying to build up immense stocks, all coal piles being completely exhausted during the previous period when coal cars were so infrequently delivered that the mines worked only a small part of the week.

The problem of production is a transportation problem and, as was stated in the discussion, perhaps the best solution would be one in which power would be transported electrically, the coal being burned at the mines to drive electrical machinery.

Mr. Keely made the statement that the failure of the railroads to supply cars was the only redeeming feature in the coal business, that only the high prices then obtainable made the industry one which could show a margin, for the competition when the railroads afforded enough cars to fill the demand was so great that the business was in such periods conducted at a loss. This is true, but there is no denying the fact that the car shortage stimulates business unduly and makes many investors enter the industry who should stay out, glutting the market with coal whenever a proper car supply again becomes obtainable.

> Runaway coal markets may bring a fleeting profit to the coal operator but the modern business man would rather have a steady and reasonable profit which would save him from aspersions as a profiteer. For these reasons he is looking around for a flywheel warranted to keep the industry running at an even number of revolutions, month in and month out. He knows that high prices only flood the coal region with unneeded producing plants and make mining unprofitable 90 per cent. of the time.

No industry can be equitably and satisfactorily conducted that requires runaway prices at some times to overcome down-at-the-heel prices at others. The coal industry should be conducted on the basis of steady and reasonable returns at all times without plethora or famine. If only it could be arranged that it would pay the consumer to buy the year over, keeping the men engaged in the industry busy all the time, we would have a business which would meet the approbation of the public. Every effort should be directed to that end. A freight differential, and even a wage differential, in the summer would have just that effect.

It would make it customary for the buyer who had or could secure storage facilities to buy coal then. It is the duty of the buyer to lay in for the winter. It is not right for him to memorialize the public to compel fair prices and large output during the winter months so that he can crowd production into a few hectic weeks when all the rest of the year mine workers and equipment lie idle. Operators have a right to make hay when the sun shines if the sun shines only once in ten years.

It is to the best interest of the buying public as a whole to spread its purchases, but without differentials self-interest is so strong that each individual buyer will not buy unless he has a reasonable assurance that winter will bring a higher rate for coal. All parties—public, railroads, operators and mine workers—should combine to keep the coal industry in steady operation at a reasonable rate of profit. But unfortunately, the coal industry is now prince and now pauper. A better way would be a condition with less of a gambling chance.

Short Time Due to Meager Demand

As it is now, a lack of need for coal is accompanied by an even greater shortage of demand, for when the coal requirement falls the demand falls below even the small need and the mines work only a fraction of the time. The certainty of a bigger price in the winter would regulate the industry, as has been proved by the experience in the anthracite region. The differentials obtaining in that branch of the coal trade, bitterly opposed as they have been by the uninstructed public, have been approved by Government officials, and anything tending to establish such a 100 per cent. of production from month to month would be a blessing to every one, whether public, employers or employees. There is a terrible waste in the ebb and flow of the coal industry.

Waiting for work and then overworking, the business of producing coal has become a gamble. A slightly lower rate in the summer, when coal production is least difficult and when railroading is conducted under favorable circumstances, would put the coal business on a wholesome basis free of apparent profiteering, recriminations between operator and employee, and quarrels between the public and the industry.

The discussion on the recovery of coal developed the usual doubts as to the feasibility of mining all the coal in, at least, certain of the seams of West Virginia and a question as to the possibility of mining beds above those worked if the lower beds are mined completely. As usual the Pocahontas and the Fairmont men believed an 85 per cent. recovery of almost any bed was possible and there were many who felt that the damage to beds above had been over-rated as a general proposi-

tion, but the representatives from the Kanawha river field were unconvinced as to both the former propositions. These matters must always be approached with some diffidence till someone has gone into the field in question and shown how, and how easily, the trick can be turned by a proper observance of the correct rules of the game.

C. R. Jones, dean of the West Virginia University, followed with an address on "Labor-Saving Devices," saying truly that labor had every reason to support their introduction and extension. Before such devices were put into operation the working man made the barest of subsistence. Today he has more leisure and a much more generous living. The difference is due entirely to the labor-saving devices that have been installed.

In the discussion which followed much was said as to the work of the coal-loading shovel at the mine face. Prof. E. N. Zern said that the shovel *per se* was without question an unqualified success. The difficulty was to get the cars to the shovel. Mr. Bowman of the American Mine Door Co. stated that at the salt mines in Retsof, N. Y., Cadwallader Evans was loading 450 tons a day with three men and a driver.

The roof of this mine is of great strength, and rooms of ballroom size can be extracted without the use of any timbering and as a consequence it is possible to shoot, it is said, enough salt in one room to keep a single shovel busy for a full day. The problem to be solved is one of supplying the shovel with cars and not of shoveling.

The manufacturer has supplied the operator with the tools for his purpose, and it is up to the industry to provide the means by which the shovel can be kept operating steadily at capacity. In short, the shovel being provided, it remains for the industry to discover some means of building the mine around the shovel so that the tonnage may be safely and expeditiously loaded by it. This is the problem. The manufacturer has not failed, it is the mine manager.

Some Remarks on the Future

On Wednesday, Prof. E. N. Zern addressed the institute on "The Coal Supply of the Future." He said:

"While felicitating ourselves on having trillions of tons of coal in this country, we have failed to take into account that the greatest bulk of coal is of low rank, and that the highest rank of coal has been relatively scarce. Production in all these years has been coming not from areas of greatest quantity, but from the areas which contain the best coal.

"The situation into which we are rapidly drifting is illustrated by the story of a large coal user in an eastern city, who some years ago in his bewilderment called a salesman and inquired why he was being given inferior steam coal, whereas in the past he had always used Moshannon coal. 'The explanation is simple,' said the salesman, 'there is not enough Moshannon coal to go around.'

"The statement that our coal resources are rapidly approaching exhaustion is every bit as misleading as to say that 99 per cent. of our coal deposits still remain untouched and there need be no concern for the future. Both statements are in need of qualification.

"Many of the various mining localities, producing high-grade coal from our most valuable and accessible seams, are reaching, or have already passed, the peak of production and must steadily recede in output.

"This is especially true of coal deposits tributary to the industrial region of the Middle Atlantic.

"After a century of marked advantage in mining, we are passing through the twilight zone and must soon emerge from this to encounter more difficult mining in seams of widely varying quality.

"Not only will coal mines of the future be attended with more difficulties and hazards, but, furthermore, it will be more costly. The initial investment will needs be greater. Until recently, comparatively few shafts have been sunk, and most of these of shallow depth A time is rapidly approaching when mining by shaft will be the rule, instead of the exception.

A paper by W. T. Heatherman on "The Most Common Violations of the Mining Law" and by J. W. Bischoff on "Preparation of Coal" concluded the meeting. Mr. Bischoff quite wisely said that the reputation of a coal was quite largely determined by the presence of pieces of slate and bone which if taken count of by analysis would not be considered of any great importance. One per cent. of visible ash would lead to the rejection of a whole carload of coal where 5 per cent. of excess intrinsic ash would be overlooked by the consumer.

After all, the loose slate and bone are the operator's and miner's fault, and not their misfortune, and it is much easier to overlook a misfortunate inability to deliver good coal than to pass over an apparently deliberate indifference as to quality. As the motto goes, "What can't be cured must be endured," but slatey coal can be cured where high-ash coal cannot.

The miner and operator regard coal as being worth what they get for it. They do not see why they should spend more time and money eliminating impurities than the purchaser pays for them. But they should never forget that the purchaser has a right to entertain a different view. The coal he gets is coal plus railroad transportation, plus delivery from the yard, plus the fireman's wage, plus the ash remover's charge (unless the last item can be saved by the value of the ashes for concrete or filling or the ash can be dumped without expense). To him also ash causes actual coal waste by imperfect burning. He does not regard the ash impurity as indifferently as the operator. It reduces his boiler capacity and makes it hard to run his machinery. The operator must sense his point of view or give way to someone who will.

Many were the necessary and advantageous assumptions of authority during the period of the war. Among these was the act of Josiah Keely and Karl F. Schoew, president and secretary, respectively, of the West Virginia Coal Mining Institute, in extending the period of their service beyond the period contemplated in the by-laws of the organization. No meeting having been called during the war, they could not provide for an expression of the mind of the members and carried on most manfully and prudently without any mandate. The institute before it closed its session voted to extend their period of office till the winter session, when an election will be held.

Kentucky Mining Institute

A GOOD attendance was secured at the Kentucky Mining Institute which met in the Phoenix Hotel, Lexington, Ky., on June 6 and 7. The members saved themselves a lot of time by not looking themselves over and wondering why they were not assembled in larger numbers, which is the regular way in which mining institutes waste time and discourage membership.

Professor Freeman was introduced by the president, K. U. McGuire, and he made a statement regarding a project of the universities and institutions of learning generally to erect memorial buildings in honor of those who fought and who died in the war. The University of Kentucky proposes to erect a Students' Activities Building in Lexington on Limestone and Winslow Streets, facing the latter, to cost $300,000. From 3 to 290 persons in each of the 120 counties in Kentucky died in the war, a total of 2736 Kentuckians, counting both the male and female members of the service. The institute, before it adjourned, voted an indorsement of the commemorative movement.

The president then read his annual address. Mr. McGuire is not one of those who are disposed to resist progress, and that his remarks well proved. "The coal operator," he said, "who so desires, will find it futile to oppose the demands of laboring men and women for constantly improving conditions of work and living. He should rather engage in a generous rivalry with other operators and devise and imitate social betterments. By such improvements he can do much to forestall Bolshevism in America."

Mr. McGuire would have mines safer and healthier places to work in. "The interior of a coal mine cannot be made a garden of roses, but fewer men and more machines inside the mine and more men outside in related industries is the desirable situation."

"These related industries, including iron and steel and the distillation of byproducts, dyework, roofing and road-surfacing materials, will be established and colonized in Kentucky, in close con-

junction with the coal industry, which will derive a great benefit thereby."

M. L. Fellmer, safety engineer, T. H. Masten & Co., then discussed "Human Engineering," which he regards as a better word to use than "welfare." Everyone is seeking a synonym for that unhappy word, though it is really not so unfortunately chosen as is generally thought. We may well presume that "human engineering" will not be any more than a temporary solution, seeing that the comparison of a man to a machine which the expression contains is far more objectionable than the implications in the word "welfare." Every word expressing benevolence has to be changed almost every decade, because the older words have become offensive by their use in connection with acts of pretense and grandiloquent phrases. "Welfare" is a homely word which might well be used, if the work it expresses is done with due regard for the sentiments of the people who profit by it. If the manner of the engineering is offensive, "human engineering" will soon be more accursed than "welfare."

A. H. Reed read a paper on "Zinc and Lead in the Kentucky - Illinois Fluorspar District," a paper which, while a distinct contribution to the literature of the subject, had little appeal to men in the coal industry, and in fact was somewhat too erudite for any but a metal-mining geologist.

Col. G. A. Burrell, who was to have read a paper, was called away to the Baltimore Tunnel at Wilkes-Barre, the scene of the recent powder flareup. He was replaced by H. D. Mason, who read an article entitled "Gas and Coal Dust in Mines." H. M. Wilson addressed the meeting on "Schedule Rating of Coal Mines for Workmen's Compensation." He made the important announcement that the Associated Companies purposed to put in operation a combined system of schedule and experience rating in which the rate would be based on the past experience of the underwritten company as well as on its provisions for safety. The schedule rating was made supreme and exclusive by the Associated Companies when the field of workmen's compensation was first created in the United States, and for this reason: There were no statistics that would give a true experience rating or permit the establishment of a rating based partly on absence of physical hazards and partly on experience. Now, however, with the larger companies there have been established statistics sufficiently tangible to permit of venturing on experience rating. However, small companies, whose limited operations made their misadventures appear unduly large or the lack of misadventure unduly important, could not even now be said to have established a reliable experience rating. The averaging of adventitious happenings by breadth of experience had not in their case been sufficiently complete.

The laws of probability have come into full averaging effect with companies with many and large operations, whereas with small companies and a single operation nothing but time will tell the tale. The rating of a large company might be advantageously fixed by the experience of 18 months, but the small concern would not reach a similar basis till its accidents had been tabulated and evaluated over a period of five years.

Some controversies arose as to the origin of schedule rating in workmen's compensation and as to the reliability of the different types of insurance—reciprocal and old line. Reciprocal insurance in the workmen's compensation field has not suffered from as many lapses as in the life or fire insurance fields. There are indicia that this may continue to be the case. A more prudent handling of reciprocal insurance is growing up, and the companies buying workmen's compensation insurance are more prudent and farseeing than many individuals who in the past bought life or fire insurance policies on the mere strength of the appeal of the chromolithography with which the policy was emblazoned or on the personality of the agent who presented the insurance company's claims.

Purchasing agents are asking for figures on coal which will exhibit the proneness or indisposition of a coal to slag on the grates and make combustion difficult. Those figures are being secured by the United States Bureau of Mines for coals all over the country. Meanwhile microscopic inquiries are going on, so that we will eventually learn the nature of the wonderful complexity of material which constitutes coal.

The test of insurance comes with bad times. Unprofitable operation of the coal mines is apt to bring cancellations. An unfortunate multiplicity of accidents or a big disaster is likely to have the same result. The company is then faced with large expenditures while receiving no new accretions of capital. There is no reason why a reciprocal company should not provide against such contingencies by a large pool of resources. As a matter of fact this is not generally done in this type of insurance. But it by no means follows that this baleful inefficiency of reciprocal insurance in other lines will be followed in workmen's compensation. In fact, so far, since the companies have been working under a compensation law, and not under the common-law provisions for compensation, no reciprocal company has failed.

The last paper in the afternoon session was perhaps the best. Major A. C. Fieldner had the pleasure of describing his own important tests on the fusibility of coal ash and Dr. Thiessen's remarkable microscopic inquiry into the partly mineralized agglomeration of vegetable matter that we call "coal."

Major Fieldner has not yet made the coal industry sit up and take notice of the importance of his fusibility tests, but the manufacturing world is about ready to awaken the coal industry by calling its attention to Major Fieldner's work. The purchasing agents of the manufacturing concerns are keenly anxious to know how readily the ash will fuse in the coal that they are examining with a view to purchase. The president of the institute, it may be said, made careful note of the high temperature at which the coal he is producing will fuse in the furnace, and not a few learned for the first time the importance of facts which have been available to them for a long time in the pages of *Coal Age*.

In an early issue of *Coal Age* Major Fieldner's remarkable contribution to the proceedings of the institute will appear at length. Thiessen's work for a long time looked like a long labor lost. He spent years trying to begin to make his astounding micrographs of coal. It is not easy to slice and grind coal to such a thinness that common light will penetrate it. The time has not arrived that Mr. Thiessen can do this with anthracite, but lignite, Illinois coal and later Pennsylvania coal succumbed to the persistence of his brilliant technique, and the result is photomicrographs of startling brilliancy setting forth a story such as Thiessen alone perhaps can adequately interpret. The masses of vegetation called coal are themselves perhaps the best paleontological evidences of horizon. We are not dealing with a few roof ferns, but with vegetation in mass.

It is likely that we shall be able now to tell just what bed we are mining and solve many knotty problems and even some lawsuits in regard to the correlation of coal measures; though as someone stated, perhaps there was a variety in vegetation with location in any one moment of past time just as there is now. The sycamore rarely passes a certain line. However, temperature conditions were probably more equable, at least in Carboniferous time, and the surface of the coal bog more nearly level than is the case with our modern topography.

The institute held a luncheon in the evening at which H. M. Ernst read C. D. Burdick's paper on "Depreciation and Depletion." Mr. Burdick suggested in his address that depletion might be treated as decreasing with time, for the most easily available and operable coal is depleted first, and the load placed on early operation should be of such a character as to lighten the load on later production, when long hauls and expensive maintenance make the duty of keeping down costs an insuperable burden.

Mr. Burdick desired also to put de-

preciation as a function of tonnage instead of time. It is a fact that both depreciation and obsolescence continue their fatal work when a machine is idle. During a long or short shutdown every kind of equipment is growing old and out of date. However, if the burden is put on tonnage and not on time, the operator is less disposed to run his mines at a loss when business is bad. The temptation to run mines to reduce the losses of idleness is now only too strong. Minimum royalties, overhead, insurance and many other costs are factors of time. If they could be made by any provision factors of production, to be a charge on working mines only, then they would discourage the operation of mines at a loss.

It is a fact that many forms of depreciation are accelerated by idleness, and that much idleness is of such uncertain duration that care cannot be taken to cure that disadvantage. For instance, an idle machine can hardly be brought out when no one knows how soon the mines will start again. So the machine is left in the mine unheated by use and tends to depreciate. Moreover, many machines are worked when the mines are idle — pumps, for instance. It seems, therefore, that while depreciation by tonnage may have some financial advantages and even some argument in its favor, depreciation by time is the preferable plan.

At the conclusion of Mr. Ernst's remarks R. Dawson Hall discussed the question, "Has the Metal Industry Any Lessons for the Coal Industry?" He called attention to the excellent results —21 tons per man-shift—obtained by the Inspiration Consolidated Copper Co., which works on a day-work basis. He compared the efficiency of daymen and miners and pointed out that, owing to the lack of coördination between miners and management, the miners in coal mines were not nearly as efficient as the daymen who received more adequate equipment from the manager and more alert attention from the foreman. Miners are often found idle, but if daymen are idle the foreman is on tenterhooks.

He also showed how on railroads some firemen who are largely paid by the hour exerted themselves over-much in the performance of their duties, causing a waste of fuel. The comments made at the recent meeting of the International Railroad Fuel Association showed that the anxiety of the engineers and firemen to keep a hot fire at all times caused a considerable loss to the railroad companies. It was by no means established that the daymen would do less than the men who received payment by the piece, where there is proper supervision, sufficient encouragement in the performance of the work, suitable machinery and adequate support in the performing of their duties. These desiderata are all found with day labor. The operator finds it pays to supply them and somehow contrives to do so. With tonnage payment the operator coöperates only with a few of his men and employs only such a day-laboring force as will result in the utmost efficiency in the work of that force. He does not coördinate with the men as a whole, and so the mining operation is efficient only in spots and fails of ultimate efficiency. Time prevented extended discussion, there being an address by the chief inspector, Prof. C. J. Norwood, to follow. Professor Norwood discussed the distribution of production among the various counties and districts of Kentucky, and the number of accidents according to a similar distribution.

The following morning, articles with illustrated views were presented as follows: "Mine Rail Bonds," by C. C. Beck; "Storage Battery Locomotives in Mine Work," by J. Appleton, and "Permissible Explosives," by J. E. Miller. Frank Morris, field secretary of the National Safety Council, presented succinctly the claims of the council for the support of operators, urging the ability of that organization to support the managers in their safety plans. He said that in safety the operator found the best ground on which he and his men could work for a common end without any antagonistic points of view. Both wanted safety, and the success of the one did not hamper the other but helped him to attain some of the best objectives. Consequently, safety was the best basis for coöperation and the starting point for a coördination that might ultimately cover for both operator and mine worker the whole work of production.

Officers for Coming Year

THE institute elected the following officers: President, H. M. Ernst, general manager, West Kentucky Coal Co., Sturgis, Ky.; vice presidents, Alexander Frost, superintendent, North Jellico Coal Co., Wilton, Ky.; John P. Gorman, general manager, Hazard Coal Co., Lexington, Ky.; J. Henry Hall, president, Whitesburg Coal Co., Whitesburg, Ky.; H. H. Small, sales manager, Goodman Manufacturing Co., Chicago, Ill.; A. G. Spellman, assistant manager, St. Bernard Mining Co., Earlington, Ky.; R. C. Thomas, superintendent, North East Coal Co., Paintsville, Ky.; H. H. Townsend, Jeffrey Manufacturing Co., Athens, Ohio; Louis Francis, general manager, Lick Branch Coal Co., Coxton, Ky. The reëlection of C. W. Strickland, general manager, Ashland, Ky., to the office of secretary-treasurer was, in view of his popularity and energy, a foregone conclusion. The institute is to be congratulated on his willingness to retain the office.

The afternoon was spent in the Stoll athletic field in a somewhat hastily improvised first-aid contest, but one which was extremely successful. There were many who thought that the war, which has thinned out organizations for first aid, has made practice difficult or done away with it altogether, and has furnished an excitement that made it difficult to hold teams together, would prevent a successful meet being held. However, inquiry proved that such conditions, while they existed, did not prevent a great interest being shown in the event. The program was as follows:

One-man Events: (1) Man has been overcome by gas. It is impossible for bearer to stand erect in carrying him. Carry him 20 ft. to place where bearer can assume erect position; then carry 20 ft. by shoulder-carry. Perform artificial respiration by Schaeffer method for one minute. (2) Man found unconscious on charged electric wire; burned on right hand and forearm.

Two-men Events: (1) Simple fracture of right forearm and scalp wound on back of head. No bleeding. Treat and carry patient 30 ft., without using a stretcher. (2) Compound fracture of right forearm, with punctured wound in the palm of the right hand, which is bleeding profusely. Treat.

Full Team Events: (1) Man has been run over and right arm cut off close to the shoulder; profuse bleeding; several ribs broken on right side. Treat, and carry on a stretcher. (2) Man overcome by gas, requiring immediate removal. Burns on hands, arms, neck and face. Carry patient 10 ft. on an improvised stretcher. Two of the team at a time should be supposedly overcome by gas. Remainder of team carry patient, without a stretcher, for 20 ft. to fresh air and treat the case. (3) Man has been rescued following an explosion and has sustained the following injuries; burn of back of head and neck, simple fracture of right leg below the knee, and compound fracture of the kneecap of the left leg. Treat.

In the full-team event the first prize was awarded to the Jenkins team of the Consolidation Coal Co. They received the "Institute Plaque" of silver, which was won in 1917 by the team of the Stearns Coal and Lumber Co. It will hold the prize a year and the name of the team will be engraved on the back of the plaque. The Phoenix Hotel cup was awarded to the same team, and the institute, having by a collection in the morning session raised $300 for that purpose, promised to pay its expenses to the Bureau of Mines dedication exercises at Pittsburgh. The team will be the champion of Kentucky on that occasion.

The same fortunate fellows each received Red Cross medals for their efficiency. The W. G. Duncan Coal Co. team received $25 as award for being in second place in the contest, the Stearns Coal and Lumber Co. team took third place with $15 and the Federal Coal Co. was fourth and received $10.

The two-team event was won by the W. G. Duncan Coal Co., first; the Federal Coal Co., second; the Stearns Coal Co., third; the Consolidation Coal Co., McRoberts team, fourth.

The one-man event was won by the Federal Coal Co., first; the Pioneer Coal Co., second; and the W. G. Duncan Coal Co., third. The Consolidation Coal Co. had no less than six teams entered. Dr. J. W. Pryor was chief judge and he had six judges under his direction. The contest was under the auspices of the American Red Cross.

Preparation of Bituminous Coal—V

By Ernst Prochaska
Benton, Illinois

SYNOPSIS—*Many features are common to all jigs, and the materials of construction are confined to wood, steel plate, cast iron and reinforced concrete. Each of these has its own advantages and disadvantages. The jigging of fine coal has always been difficult, and for this purpose the concentrating table has many advantages. Such tables also give good results when used upon crushed middle products of the jigs.*

UPON the character and nature of the raw coal depends the selection of the proper type of jigs, as well as the methods to be followed in washing the coal. The different methods have been explained previously, so that we can confine ourselves to a short review of the most important differences existing in the materials used for construction, the methods of drives, apparatus for the discharge of the products and the arrangement of the jigs.

Jigs built of timber are light in weight and cheap in first cost. The jig boxes can be repaired and even totally rebuilt at the washery. But they are hard to keep tight and not very durable. The best wood for the construction of jig boxes and tanks is long-leaf yellow pine of heart specification. In some instances creosoted timber has been used. Timber construction is especially advisable if the wash water becomes acidulous.

Jigs built of steel plates are comparatively light but expensive. They must be stiffened with angle irons and braces to keep the side plates from breathing.

Cast-iron jigs appear to have the preference at present. They are rather heavy but stiff and solid. They are not affected by acidulated water and always represent the value of scrap iron, if for any reason it becomes necessary to change the type of jigs.

Reinforced concrete has been used in several instances in the construction of jig tanks. This material, however, has the great disadvantage that it is affected by acidulated water to a highly disastrous degree. The solid, heavy construction of reinforced-concrete tanks prevents also any changes or alterations. A reinforced-concrete jig tank must remain the way it has been put up in the first place, or it must be entirely rejected if changes become necessary.

The proper selection of the material of which jigs should be built depends on cost of construction, cost of upkeep, nature of the wash water and the design of the supporting structures.

Side or end plungers actuated by eccentrics give, under normal conditions, perfect satisfaction. If the coal is difficult to wash a differential motion drive for the plungers would be advisable. In cramped quarters considerable space can be saved by the use of plungers placed below the screens. For extremely large jigs compressed air can be used to advantage.

The discharge of washed coal is similar in all jigs.

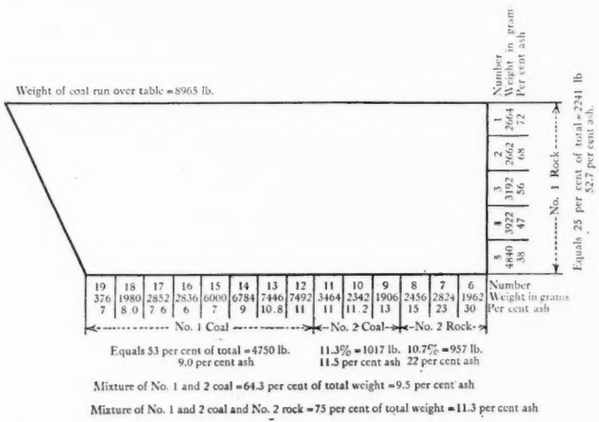

Weight of coal run over table = 8965 lb.
Number
Weight in grams
Per cent ash
1 2664 72
2 2652 65
3 3192 56
4 3922 47
5 4640 38
No. 1 Rock
Equals 25 per cent of total = 2241 lb
52.7 per cent ash
19 376 7
18 1980 8.0
17 2852 7.6
16 2836 6
15 6000 7
14 6784 9
13 7446 10.8
12 7492 11
11 3464 11
10 2342 11.2
9 1906 13
8 2456 15
7 2824 23
6 1962 30
Number
Weight in grams
Per cent ash
No. 1 Coal
No. 2 Coal
No. 2 Rock
Equals 53 per cent of total = 4750 lb.
9.0 per cent ash
11.3% = 1017 lb.
11.5 per cent ash
10.7% = 957 lb.
22 per cent ash
Mixture of No. 1 and 2 coal = 64.3 per cent of total weight = 9.5 per cent ash
Mixture of No. 1 and 2 coal and No. 2 rock = 75 per cent of total weight = 11.3 per cent ash

FIG. 10. SEGREGATION OF PARTICLES ACCORDING TO SPECIFIC GRAVITY

It consists of a simple overflow dam or weir. The discharge of refuse, however, shows many variations and has been elaborated previously. For jigs treating unsized or the larger sizes of coarse coal plain gates can be used. This type is almost universally employed on reciprocating jigs. The gates can be either of the slide or swing type. The swing gates offer some advantages over the slide gates as they permit the removal of the heaviest pieces of refuse without disturbing the bed.

The kettle or pot valves are to be recommended for coarse-coal jigs. They permit a close regulation of the slate bed and have the further advantage that they prevent an accidental loss of the slate bed, caused by

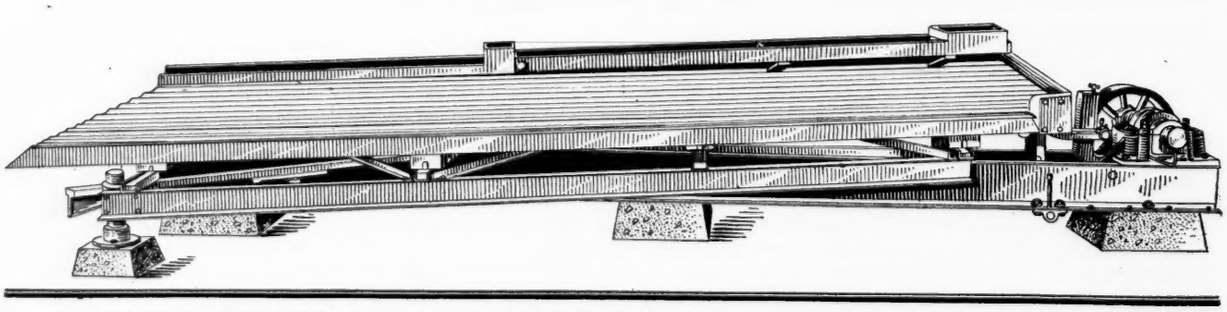
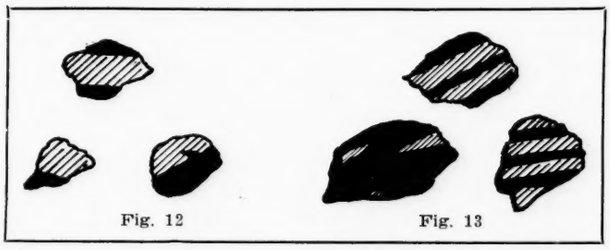


FIG. 11. DETAILS OF CONCENTRATING TABLE USED FOR REWASHING MIDDLE PRODUCTS OR SLUDGE



FIGS. 12 AND 13. HOW IMPURITIES ARE DISSEMINATED IN COAL

inattention of the operator. The kettle valve being open on top permits an inspection of the refuse. The double slate gate is nothing more nor less than a developed kettle valve extending over the whole width of the jig. It is at present the best design known, as it combines the good points of the kettle valve with those of a slide gate.

Revolving slate valves are only to be used for fine-coal jigs, as the heavy refuse accumulating in coarse-coal jigs is apt to choke up this type of valve. For the removal of the fine refuse passing through the perforations of the screens, a common molasses gate is the simplest and best device. Other types of mechanically operated valves for the discharge of hutch work have been designed, but they all appear to be entirely too complicated.

To facilitate the operation and supervision of the washing process it is desirable to locate all the jigs, including the rewash machines, on a common platform.

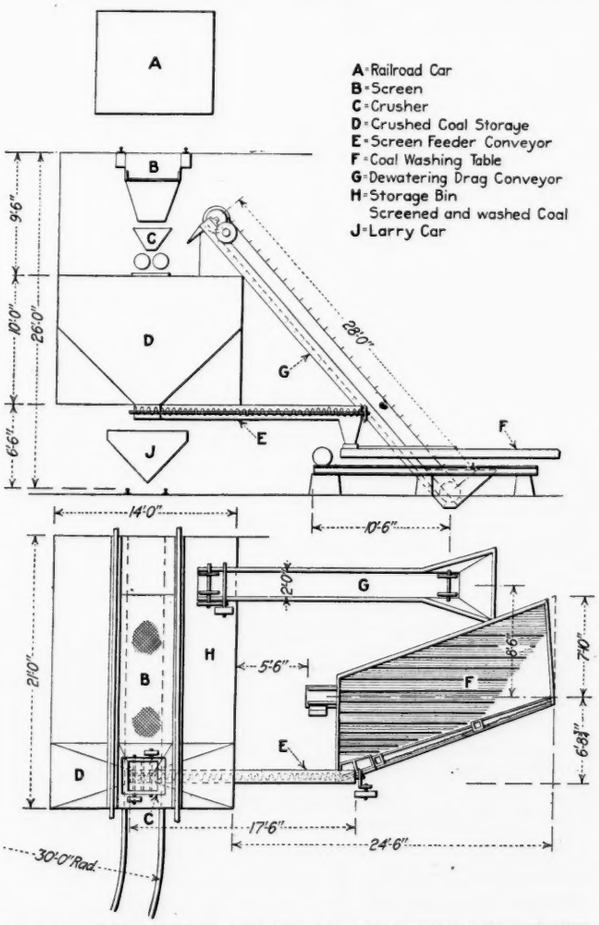


FIG. 14. PROPOSED LAYOUT OF COAL-WASHING PLANT

This permits the consolidation of a number of jigs in a battery thereby saving space and cost of installation. The rule is to provide each compartment of a jig with one separate plunger. If one plunger should be used for two compartments, there would be great danger that the jig work of these compartments would be uneven and unsatisfactory. The second compartment is treating quite different material from the first, and as explained previously length and frequency of plunger stroke must be adapted to the material to be treated. So it can be clearly seen that it will be absolutely wrong to treat two different materials with the same kind of pulsation. The jigs should be placed in such position that they will be accessible from all sides; and to facilitate the inspection of the work performed they ought to be placed somewhat higher than the operating platform.

The products delivered from the jig cannot be used without further treatment. All the products require a more or less extensive and difficult subsequent preparation before they can be placed on the market. This after-treatment depends largely upon the size of the coal. Coarse coal must be dewatered, classified and delivered into the loading or storage bins, avoiding thereby breakage and abrasion as much as possible.

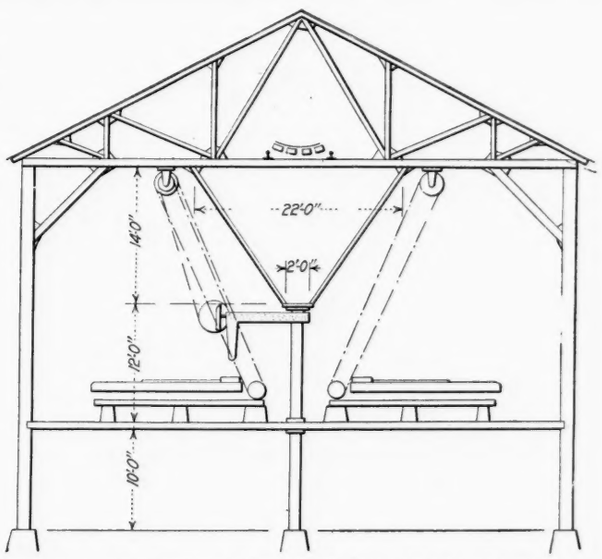


FIG. 15. ELEVATION OF TABLE COAL-WASHING PLANT

Fine coal must be dewatered and delivered into the bins or railroad cars. Middle products are either first crushed and then delivered to rewash jigs or are delivered to these machines without previous crushing. The refuse from the rewash jigs is combined with that from the primary jigs, and the washed coal is either mixed with that from the primary jigs or separately stored in bins as boiler-house fuel, according to its degree of purity. The wash water must be clarified before it can be put back into circulation.

The sludge recovered by the process of water clarification can be subjected to a further treatment, but in any case it must be dewatered before it can be mixed with the washed products. If the sludge is of such a character, however, that subsequent treatment will not improve it, it must be wasted and thrown on the refuse dump.

The refuse is delivered into refuse storage bins and from there by means of self-dumping cars or similar

devices carried to the dump. Before delivery into the bin, however, the refuse must be dewatered by means of a perforated bucket elevator, the overflowing dirty water is clarified and put back into circulation. The resulting sludge is deposited on the refuse dump. If the refuse contains pyrites, a separate installation for its recovery would be advisable. The economic value of such a plant, however, would depend a great deal upon the market value of sulphur.

For the washing of coal too fine to be treated successfully on jigs, concentrating tables are coming into use. Such tables have been employed for many years in ore-dressing plants, and the principle applied for ore concentration can also be used for coal washing. The specific gravity of the material and the size of the grains are two of the most important considerations. Specific gravity comes first and size of grains is second in importance.

Many types of concentrators for fine material have been developed, but among them the machines with the separating surface in motion and having a continuous feed and discharge are the most important. The machines belonging to this group utilize mechanical agitation to separate the grains into layers. The pulp, in its passage across the table deck, stratifies, in accordance with the specific gravity of the different particles, the heaviest seeking the lower strata between the riffles, while the coal or lighter particles remain on top, to be washed off the side of the deck by the cross flow of wash water, the heavier, or high-ash grains, being guided by the riffles and advanced to the end of the deck by the head motion and discharged as refuse. This separation is visible at all times while the table is in operation, and susceptible of exact adjustment and under easy control of the operator.

Concentrating tables for coal use riffles on the table deck. These riffles are produced by tacking cleats on the table surface. The arrangement of the riffles forms at present the main difference between the different tables. Other differences can be found in the manner in which the shaking motion of the deck is produced. In any case the backward motion should be faster than the forward motion. The movement is either parallel to the direction of the riffles or the riffles are placed at an angle to the direction of the table motion. In some cases this angularity of the riffles is only carried on for a short distance in the middle of the deck. Whatever the direction of the riffles, the table motion moves the material toward the refuse side of the machine. The refuse collected on the bottom of the riffles is carried forward faster than the clean coal forming the upper strata of the bed. The wash water, however, washes the clean coal down the slope of the table much faster than the deeper stratified refuse.

In ore dressing the line between concentrates and tailings can be usually clearly defined, but with coal this is not possible. Between clean coal and pure refuse we find a more or less wide area containing the so-called middle products. Therefore it becomes necessary to make either three products or to establish the division between coal and refuse at the most economical and efficient point. Fig. 10 shows clearly the segregation of the particles according to their specific gravity, which is influenced by the amount of ash.

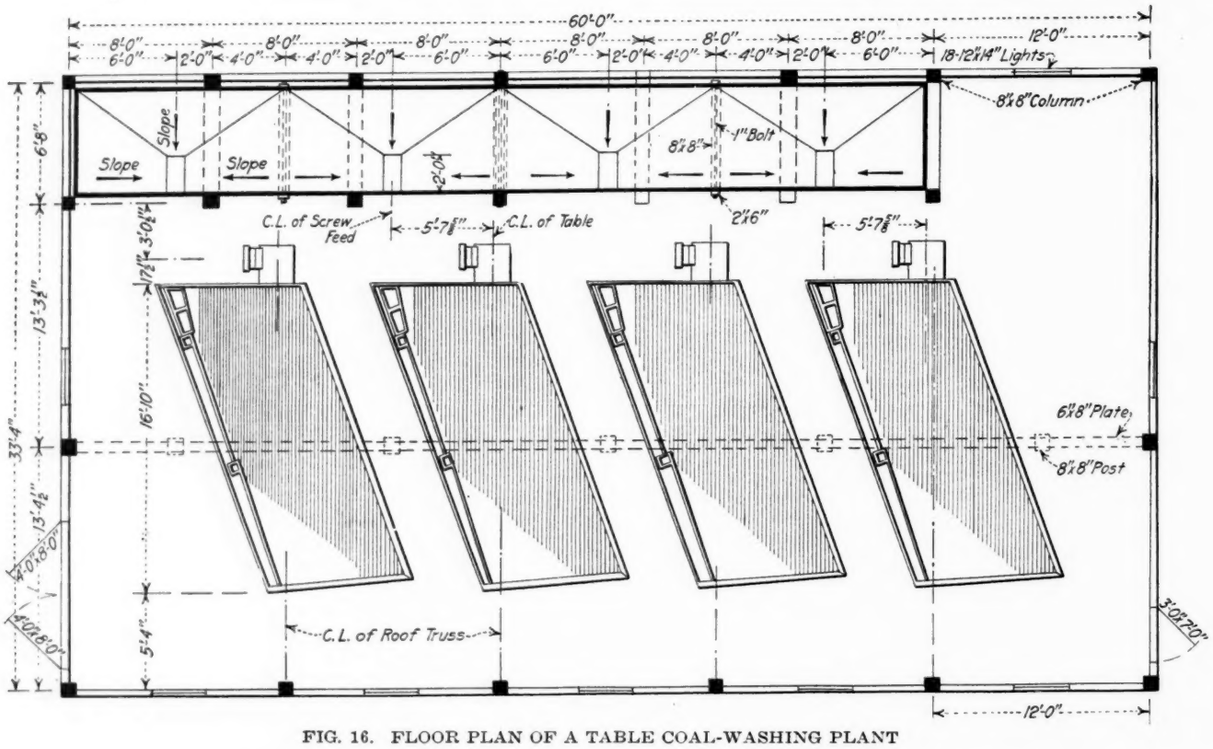


FIG. 16. FLOOR PLAN OF A TABLE COAL-WASHING PLANT

The materials contained in raw coal do not show an increase in specific gravity by clearly pronounced steps. The specific gravities increase by infinitesimal increments, and if we plat the specific gravities of the different materials we will get a continuous ascending curve and not a broken straight line interrupted by distinct steps.

The proper washing of fine coal has for a long time been an uncertain undertaking. With the advent of concentrating tables, however, the difficult problem of washing fine coal has been solved in a satisfactory manner. With coking coal there now exists the possibility

of abandoning the use of jigs entirely, by crushing all the coal to the required fineness and treating it on tables. This fine crushing will liberate more effectively the bone coal, and tables will therefore produce cleaner washed products. The reason for the foregoing is obvious. The finer the coal is crushed the more complete is the physical separation of coal from its impurities, and it only remains now to accomplish the segregation of the coal from them.

Tables require little power, about 1 hp. is sufficient to operate one table. The supporting structure for a table can be much lighter than for jigs, and the building housing such machines does not need to be so massive. Figs. 11, 18 and 19 show a concentrating table adapted for coal washing.

Besides primary washing, tables can be used to good advantage either for the rewashing of recrushed middle products or for the rewashing of the sludge recovered from the water clarification. For this latter purpose a slightly different type of machine should be used, resembling the slime tables used in ore dressing. Concentrating tables can be used economically at every

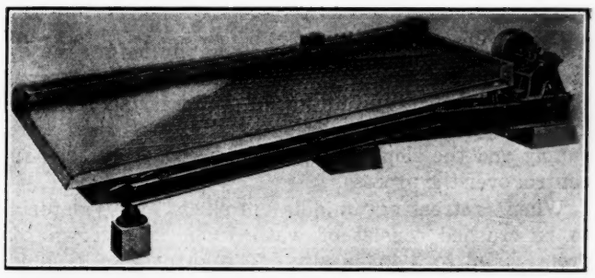


FIG. 19. CONCENTRATING TABLE ADAPTED FOR COAL WASHING

ity tables are equal to jigs treating the same kind of coal. Outputs up to 12 tons per hour have been recorded for one table. Fig. 10 indicates clearly the manner in which the separation is effected on one of these machines and shows the possibility of making any kind of washed product or refuse by simply dividing the outflowing product at any desired point along the side or end of the table.

A=Length of Building
B=Length of Table Storage Bin
C=Coal Washing Tables
D=Table Storage Bin
E=Conveyor (R.B. & C.H. to Table Storage Bin)
F=Screw Conveyor Table Feeder
G=Washed Coal Launder
H=Tailing Launder
J=Washed Coal Dewatering Elevator
K=Tailing Elevator
L=Overflow Launder (Dewatering Elevator to settling Tank)
M=Conveyor to washed Coal Storage Bin

CAPACITY IN TONS PER HOUR	A	B	C
100	108'-0"	72'-0"	12
200	180'-0"	144'-0"	24
300	252'-0"	216'-0"	36
400	324'-0"	288'-0"	48
500	396'-0"	360'-0"	60

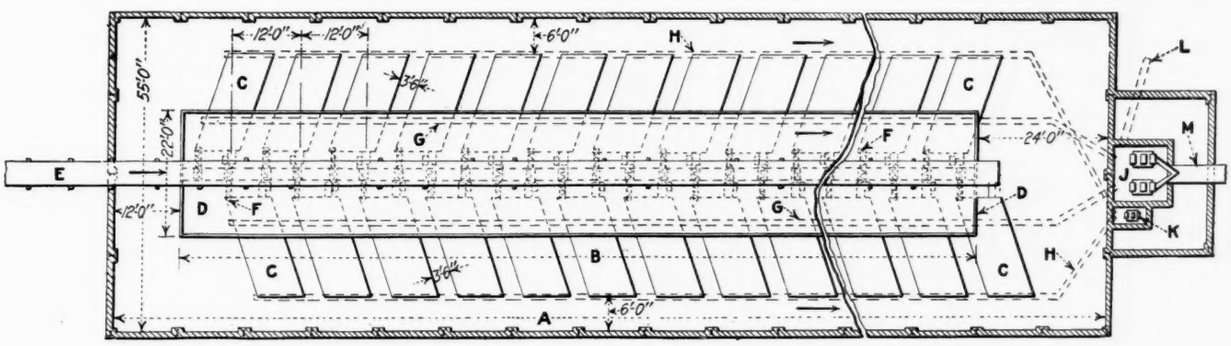


FIG. 17. LAYOUT OF A TABLE COAL-WASHING PLANT

washery, and at present they represent the most feasible apparatus for treating fine coal and sludge. They unquestionably offer many advantages in an economical as well as purely technical way.

The cost of installation is low, they require less expensive buildings and foundations than jigs. The cost of operation is considerably less than that of jigs on account of the small power required, the reduced wear and tear and less supervision. One operator can watch twice as many tables as jigs. In regard to capac-

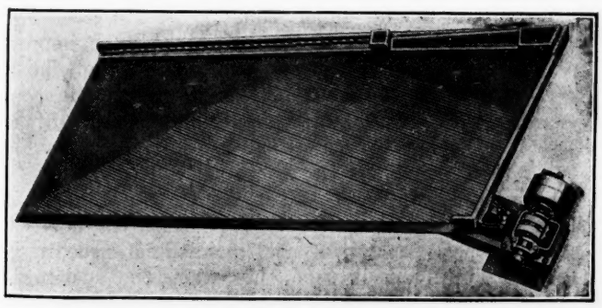


FIG. 18. TOP VIEW OF CONCENTRATING TABLE ADAPTED FOR COAL WASHING

The following tables show some results obtained in table work:

	Weight, Lb.	Per Cent.	Ash, Per Cent.	Sulphur, Per Cent.
Raw coal	481	100	12.50	2.67
Washed coal	406	84.4	6.71	2.04
First middle product	30.5	6.3	29.19	5.72
Second middle product	38.5	8.0	42.65	6.02
Refuse	6.0	1.3	65.00	10.54

SEPARATION BY SPECIFIC GRAVITY

Washed coal	Lighter Than 1.37 Sp.g. 82.2 per cent.		Heavier Than 1.37 Sp.g. 17.8 per cent.
	Lighter Than 1.35 Sp.g.	Between 1.35 and 1.50 Sp.g.	Heavier Than 1.50 Sp.g.
First middle product	12.5 per cent.	21.0 per cent.	66.5 per cent.
Second middle product	11.4 per cent.	12.7 per cent.	75.9 per cent.
	Lighter Than 1.45 Sp.g.		Heavier Than 1.45 Sp.g.
Refuse	2.2 per cent.		97.8 per cent.

RESULTS OBTAINED ON TABLES WITH SULPHUR ELIMINATION

	Raw Coal	Washed Coal	Side Middlings	End Middlings	Refuse	Elimination in per Cent.
Per cent. sulphur.	3.31	1.47	1.50	3.02	24.30	55.7
	3.47	1.25	1.38	2.33	23.28	63.9
	3.41	1.37	1.55	2.43	14.68	59.9
	3.12	1.30	1.37	2.55	16.94	58.3

Raw coal sulphur, per cent.	2.76	2.93	2.76	3.21	3.59	3.75	3.08	3.53	4.06	4.74
Washed coal sulphur, per cent.	1.26	1.38	1.29	1.48	1.43	1.88	1.59	1.37	1.37	1.34
Elimination in per cent.	54.3	52.9	53.3	53.9	60.2	49.9	48.4	61.2	66.2	71.7

The great advantage of a table lies in the fact that the process of separation is immediately before the eye and any desired change can be made without interrupting the operation. The outflow of the materials is visible, and by a judicious regulation of the stroke, the water supply and the slope of the table, the operator has full control over the process.

When retreating middle products the materials to be crushed consist of washed but intergrown coal from $\frac{5}{10}$ in. to 3 in. in size. The purpose of crushing is to break up the intergrown particles in such a way that the slate or bone adhering to or disseminated throughout the coal shall be mechanically separated from it. This will give a homogeneous mass of material suitable for rewashing.

Two considerations must be taken into account. The character of the middle product influences, at least in a theoretical way, the crushing process. The most suitable method would be, without doubt, to spall off the slate and bone without crushing them. This would make the subsequent water clarification and sludge recovery much easier. But the foregoing procedure would only be possible if the impurities are attached to the coal as shown in Fig. 12. This condition occurs only in solid coal, where the impurities are to be found at the cleavage line between the bed of coal and

CRUSHER DATA

Type	Crushing — From	Crushing — To	Capacity per Hour in Tons	Power Required
Roll crusher	3 in.	¼ in.	6 to 60	3 to 25 hp.
Gyratory crusher	3 in.	¼ in.	1 to 12	2 to 20 hp.
Disintegrators	3 in.	65 mesh	3 to 85	2 to 150 hp.

the roof or the bottom. In most cases, however, we must consider impurities, which are more or less disseminated throughout the coal mass, as shown in Fig. 13. In this case a crushing of the impurities cannot be avoided. (2) In every case the degree of crushing—that is, the difference between the size of the material before and after crushing—must be made as small as possible. The crusher giving the greatest yield with the smallest amount of sludge is the one most suitable, because this permits the most perfect separation. Whether, in each separation case, the yield or the amount of sludge should be considered more important depends on the one hand upon the difficulty of water clarification and on the other hand upon the value of the fine coal.

The crushing plant ought to be located between the primary and rewash jigs. This will necessitate the installation of an elevator, because all the jigs should be located upon one platform at the same level.

The crushing of the middle products can be accomplished either with roll crushers, gyratory crushers or disintegrators. Roll crushers can have either smooth or slightly corrugated rolls. Such crushers will permit the free passage of flat pieces of slate, which affords a decided advantage over all other types. For crushing down to $\frac{3}{16}$-in. size, roll crushers are well adapted. If the middle product should be crushed still finer, gyratory crushers or disintegrators are advisable. Gyratory crushers can be used down to $\frac{1}{16}$ in. size, and for still finer crushing disintegrators should be employed.

The process of rewashing does not differ materially from the process used in primary washing. The regulation of the rewash process depends upon the purpose for which the resulting products will be used. If, according to the character of the middle product, only boiler-house coal can be made, close washing is not necessary and the rewashing should be carried on in such a way that the resulting refuse will be as free from good coal as possible. If, however, the middle product is of such a nature that the pure coal contained therein is good enough to be mixed with the primary washed coal, the middle product should be washed very closely. In some cases it would be more economical to rewash for boiler-house coal only, even though the product of the rewash jigs could be made clean enough to be mixed with the primary washed coal, on account of the great loss of good fuel in the refuse, imposed by trying to get a perfectly clean washed product.

(To be continued)

Steam-Operated Coal Conveyor from Tipple to Boiler House

THE most economical method of conveying screenings from tipple to boiler house is a problem that has often been discussed. The most satisfactory solution has never yet been found. Many mines employ various forms of flight and carrier conveyors, driven by steam or electrical power. Others use the old-fashioned method of car and track. A small dump car filled with screenings is pushed to the interior of the boiler plant, where it is dumped before the boilers.

The American Steam Conveyor Corporation has adapted its steam ash conveyor so that it can be used for handling boiler coal. The conveyor thus constructed consists of a line of pipe extending from a point directly under or alongside the screenings hopper in the tipple to a discharge point in the boiler room. The coal is fed into an intake in the pipe and is carried to the discharge point by the action of an air current.

This current is created by the action of a jet of high-velocity steam discharged into the center of the pipe line in the direction of travel of the coal. This steam discharge tends to create a vacuum behind it, which in turn creates a current of air through the air intake in the line.

The coal intake is located conveniently before the tipple hopper, so that a laborer can rake the coal into the intake with small effort. The powerful suction pulls the coal through the system toward the "steam unit fitting," that point where the steam is introduced into the system. Here the force of the steam ejects the coal along the "discharge line" of the system.

When coal is needed in the boiler room a laborer opens a steam valve, allowing the steam to enter the system. The coal is then shoveled or raked into the intake tee, where the air current whisks it to the disposal point in the boiler house.

This disposal point may be a large bin or hopper in the top of the power plant, or it may simply be a target box with long spouts through which the coal is withdrawn to the boiler-room floor below. Since the delivery spouts are movable there is little trouble in placing the coal exactly where it is needed.

The manufacturers of this system claim that it is one of the most economical and efficient yet devised. The steam cost per ton of coal handled is exceedingly small, as the steam is used only when the system is in actual operation. The labor cost is likewise low, as one man can quickly shovel enough coal into the intake tee to supply the boilers for a long time.

Coal Age Is in Receipt of the Following Letter:

Promotion of Friendly Relations with the New Nations of Europe

I AM wondering whether we cannot enlist the assistance of many of our mine managers to inform the foreign-born Americans in their employ that Mr. Hoover, as Director-General of the American Relief Administration, has made it possible for individuals in this country to transmit funds to their relatives in Finland, Poland, Czecho-Slovakia, German-Austria, Jugo-Slavia (including Serbia), Rumania and Turkey.

In securing this exclusive privilege from the Federal Reserve Board, the Government has been chiefly interested in reëstablishing the banking connections between the newly liberated countries and America. It is the first concrete move that has been made to put these people on their feet.

As I look upon the intervention of our Government in Europe, it can be divided into four distinct stages: First, armed intervention; second, suggestion of peace terms which finally led to the signing of the armistice; third, supply of relief to the liberated countries; fourth, reëstablishing of commerce between the liberated nations and the outside world.

Each successive stage represents the natural advance beyond the preceding stage, and all constitute a logical sequence of overlapping steps. For instance, armed intervention against Germany, even if successful from a military point of view, would not of itself have attained our full purposes in entering the war. Having effected the isolation of Germany, we had to endeavor to secure a satisfactory arrangement as to geographical division of territory. With this in the way of accomplishment, we could not abandon the new countries thus established without making some effort to supply them with food.

Having drawn upon our stocks of food in America and placed these supplies at the disposal of the liberated countries in order to meet their requirements until their own harvest becomes available, we shall not have fulfilled our entire obligations unless we make some effort to reestablish commerce.

Commerce is fundamentally dependent upon definite financial relations between countries that hope to do business with each other. The development of the fourth stage of American intervention, therefore, has its beginning in the plan that has been worked out by Mr. Hoover by which the banks in America are offered immediate contact with the banks in the liberated countries, through the medium of the American Relief Administration. Beginning Apr. 22, this new arrangement afforded foreign-born Americans the opportunity to forward individual money gifts or payment of money to firms, persons, institutions or relatives at home. It was expanded in May, so that drafts could be purchased on home banks, and travelers could leave America with the satisfaction of knowing that their dollars here had a definite value in the currency of their own country at home.

It is obvious that it would have been impossible in the early stages after the armistice to set up any such banking relations without the intervention of the Government, and this was made possible by the relief work of the American Relief Administration in Europe. But this is merely a stepping stone to permanent commercial arrangements, and the foreigners in America are asked to support this exchange system now as it represents the definite beginning of financial connections between this country and the liberated nations. While it is chiefly represented at the present moment in the transactions in food, it will gradually be transformed into transactions covering other commodities and lead to definite trade relations. It is prohibited by law to send money by any other medium, and no one of foreign birth can justify using any other means for sending money to his relatives, as the support given by him to the American Relief Administration in this work is indirect support of his own Government as well as that of the United States in its effort to complete the fourth and final step of its intervention in Europe.

THE FOLLOWING RATES are in effect, beginning June 1, until further notice:

Finland.....	9.65	Finmarks	per	Dollar
Poland.....	14¼	Polish Marks	per	Dollar
Germany.....	12.65	Marks	per	Dollar
Austria.....	24	Kronen	per	Dollar
Czecho-Slovakia	15½	Kronen	per	Dollar
Jugo-Slavia....	23	Kronen	per	Dollar
Rumania.....	9.35	Lei	per	Dollar

EDGAR RICKARD, *Joint Director*
AMERICAN RELIEF ADMINISTRATION
June 5, 1919 42 Broadway, New York

In order to promote this commendable enterprise, *Coal Age* has donated a page advertisement on this subject, which appears in this issue. The advertisement has been put in such a form that coal mine managers may cut it out and post it on their bulletin boards for the general information of their employees, and we urge that this be done. Also, we urge readers associated with companies employing men of foreign birth to cut out this page from their copies of the paper and hand it to the manager so that an ample supply of these notices may be available at each mine and works—EDITOR.

Anthracite Mining Costs

By R. V. Norris
Wilkes-Barre, Pennsylvania

SYNOPSIS — *On account of the greater range of sizes and prices received for anthracite coal, the fixing of a fair price for this fuel was somewhat more complicated than was the establishment of a reasonable price for bituminous. Decreased margins of profits during the war period were absorbed by the coal producers themselves.*

IT WAS stated in a former article[1] that an intensive study of anthracite costs was being made by the engineers of the United States Fuel Administration. The results of this study are now available and are offered as a supplement to the former paper. Anthracite costs as reported for the six-months' period, December, 1917, to May, 1918, inclusive, as compiled by the Federal Trade Commission, were used as a base, and charts similar to those described in the former article were made for the standard white-ash anthracite and for red ash and Lykens Valley coals. The adjustments of cost from a reported to a price-fixing basis, as described for the bituminous methods, were applied but showed only minor adjustments as necessary.

The great spread in anthracite prices on the varying sizes, which for the six-months' period under review ranged in average from $5.244 for nut to $2.074 for barley coal, makes the question of the percentage of sizes produced at the different collieries a vital one. The realization with the same prices for each size must be within wide limits, when it is considered that the percentage of prepared coal reported from different collieries varied from over 80 per cent. to below 30 per cent. for fresh-mined coal. Hence, as the spread in prices for the various sizes must be predicated on some percentage, it is essential to find some method of adjustment to allow for this variation. The logical method of adjustment is to calculate actual costs to costs as of the standard percentage of sizes, so that the margin between the adjusted costs and the average realization shall be the actual margin for each colliery between its actual costs and actual realization due to its particular percentage of sizes. As a base for realization the actual percentage of sizes for fresh-mined coal for the six-months' period was adopted. This percentage is given in Table I.

TABLE I—PERCENTAGE OF SIZES OF FRESH-MINED COAL

Size of Coal	Mesh, in Inches — Through Round	Mesh, in Inches — Over Round	Percentage of Sizes — Fresh Mined	Washery	Fresh Mined and Washery
Broken		4½	3½	3½	6.8 / 0.4 / 6.2
Egg	3½	3¼	2⅛	2¼	14.6 / 1.2 / 13.5
Stove	2⅛	2¼	1⅞	1⅞	19.6 / 2.3 / 18.2
Nut	1⅞	1½			24.7 / 10.1 / 23.5
Pea					9.1 / 10.0 / 9.2
Buckwheat					11.6 / 21.4 / 12.4
Rice					3.2 / 14.9 / 4.2
Barley					4.9 / 27.5 / 6.8
Boiler					3.9 / 8.8 / 4.3
Screenings					1.6 / 3.4 / 1.7

For adjustment as a base for fixing a spread of prices the percentages used were, taken at even figures, prepared 65 per cent., pea 9 per cent., buckwheat 12 per cent. and smaller 14 per cent.

The adjustment finally arrived at after long study was tested on actual reports from collieries having percentages that varied from over 80 per cent. to under 30 per cent. of prepared coal and was found to be correct within a maximum variation of less than 1½ per cent. It was as follows:

For Each 1 per Cent. Variation	Above Standard, Per Cent. Deduction	Below Standard, Per Cent. Addition
Prepared	1.20	1.20
Pea	0.85	0.85
Buckwheat	0.75	0.75
Smaller	0.50	0.50

As examples of the working of this adjustment with prices assumed at about the average for the six months and taking mines well away from average percentage of sizes.

Size	Base per Cent. Sizes	Base Price	Realization	Mine A, per Cent. Sizes	Correction, per Cent.	Actual Realization	Mine B, per Cent. Sizes	Correction, per Cent.	Realization
Prepared	65	$5.10	$3.315	73.1	—9.72	$3.730	55.1	+11.880	$2.810
Pea	9	3.70	.333	6.4	+2.21	.237	15.3	— 5.355	.566
Buckwheat	12	3.20	.384	10.4	+1.20	.333	13.7	— 1.275	.438
Smaller	14	2.20	.308	10.1	+1.95	.222	15.9	— 0.950	.350
Totals	100		$4.340	100.0	—4.36	$4.522	100.0	+ 4.30	$4.164
Assumed cost for each mine					$4.000				$4.000
Actual margin					$0.522				$0.164
Standard realization					$4.340				$4.340
Calculated cost as of standard per cent. sizes	$4.00 × 0.9564% =				$3.826	$4.00 × 104.30% =			$4.172
Calculated margin					$0.514				$0.168

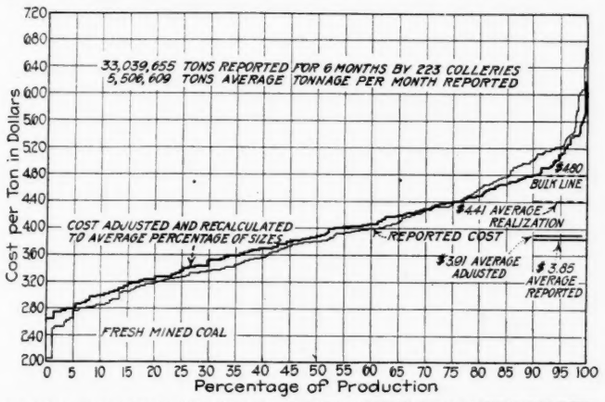
The correction for Mine A is then —4.36 per cent. and the adjusted cost $3.826, showing 51.4c. margin on the $4.34 standard realization against 52.2c. actual margin. Similarly for Mine B, the correction is +4.30 per cent., giving an adjusted cost of $4.172 and a margin of 16.8c. as compared with the actual margin of 16.4c. Thus the adjusted costs on the chart bear a true relation to the realization received from a scale of prices for the various sizes based on the standard or average percentage of sizes adopted as a base, regardless of the actual percentage of sizes produced by each operation, and prices can be fixed from the chart line of adjusted costs which will result in giving each mine its intended margin. The correction, of course, is an allocation based on realization from the different sizes and could be made more accurately by taking into account each size produced, but at the cost of more time than was available for the work. With a material variation in price, different factors of correction should be calculated.

A large percentage of the anthracite coal is owned in fee by operators, who also lease tracts contiguous to their fee holdings. As all report royalties on the basis of tonnage produced, the general average 15.5c.

[1] *Coal Age*, Oct. 10, 1918.

per ton reported is misleading. The actual average royalty reported by operators mining generally from leased lands was 33.25c., and by those generally mining from fee lands, 5.5c. As relatively few operators mine exclusively from either class of lands, no data are available to show the actual average royalties paid, but it is believed that the present average would be approximately 40c. per ton.

A few leases, notably those made by the trustees of the Girard Estate, owned by the City of Philadelphia, base the royalty payments on a percentage of the sale price of the coal at the mines instead of requiring fixed royalties; this percentage varies from 15 per cent. to as high as 28 per cent. of the price. As the labor war bonuses materially add to the sale price, these have


33,039,655 TONS REPORTED FOR 6 MONTHS BY 223 COLLERIES
5,506,609 TONS AVERAGE TONNAGE PER MONTH REPORTED
$4.80 BULK LINE
$4.41 AVERAGE REALIZATION
COST ADJUSTED AND RECALCULATED TO AVERAGE PERCENTAGE OF SIZES
REPORTED COST
$3.91 AVERAGE ADJUSTED
$3.85 AVERAGE REPORTED
FRESH MINED COAL
Cost per Ton in Dollars
Percentage of Production

COST OF PRODUCTION OF ANTHRACITE FROM DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

resulted in excessive royalties and serious embarrassment to the operators, who were not allowed to increase the price of coal sufficiently to even fully absorb this additional labor cost and by whom the extra royalties must be paid out of already narrow margins. Many of the lessors have patriotically foregone the extra royalties due under these sliding scales, and as it is certainly improper that the public should be asked to pay these additional royalties, not contemplated in the original contract though enforceable at law, the United States Fuel Administrator has expressed himself as unwilling to consider such excess payments in any fixing of anthracite prices.

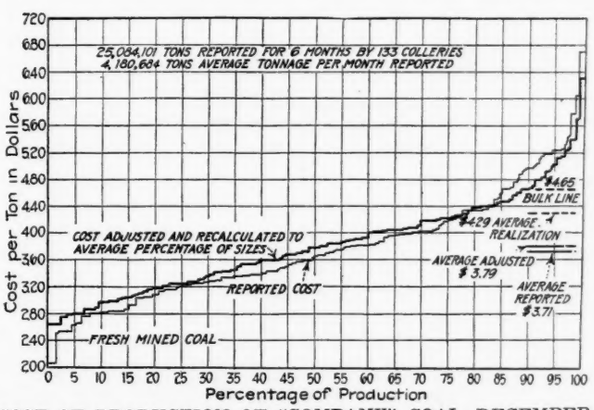
Cost charts were made from averages of the six months, showing both the reported and the adjusted costs for standard fresh-mined white-ash anthracite, both by collieries and by operating companies. As, in the prices fixed by the President, Aug. 23, 1917, a differential of 75c. per ton on pea size and above, equivalent to 52.95c. per ton on all sizes, was established for the independent operators over certain companies with railroad affiliation, generally known as the "companies." Charts were made by collieries for both the independent operators and the companies, as well as a combined chart of the entire output. Similar charts were also made for the entire output of fresh-mined coal and for the total output including washery coal by operating companies, all collieries operated by a single company being consolidated. Similar charts were made for red ash and for Lykens Valley coal. These charts were interesting principally in that they showed that the higher prices charged for these specialties were justified by their higher costs of production. The charts given are believed to fairly show the general costs of production. These charts show the averages and bulk line costs for standard white-ash coal given in Table II. The average prices received are given in Table III.

The prices received by the companies and independents have not been separately averaged, but calculating on the differential and assuming the percentages the same for companies and independents, which is only approximately the case, the selling price of fresh-mined coal would average for companies, $4.287 and for independents, $4.817. Margins over reported costs of companies would be 58c. and for independents 45c. with a general average margin for all fresh-mined coal of 56c. and for all coal including washery of 71c. per ton, and under "bulk line" costs fresh-mined companies, 36c.; independents, 15c.; total, 39c.; including washeries consolidated sheets total of 7.5c.

These margins include all expenditures for Federal income and excess profit taxes, selling expenses, interest charges, expenditures for improvements and developments to increase output, excess of capital expenditures over normal cost, and all profit on the investment of about $8 per ton of annual output.

Effective Dec. 1, 1917, a labor war bonus, ranging from 60c. to $1.10 per day for labor and 25 per cent. for contract miners was granted over and above the wage scales effective by agreement Apr. 1, 1916, expiring Apr. 1, 1920, and the prices fixed Aug. 23, 1917, and modified Oct. 1, 1917, by reducing pea coal 60c. per ton, were increased by 35c. per ton to compensate for this labor increase. The actual reported increase in labor cost due to this advance was figured by the Federal Trade Commission from the operators' reports to be 60.3c. From the actual payroll figures later obtained by the United States Fuel Administration, this increase was found to be 76.3c. per ton.

Effective Nov. 1, 1918, a second labor war bonus


25,084,101 TONS REPORTED FOR 6 MONTHS BY 133 COLLERIES
4,180,684 TONS AVERAGE TONNAGE PER MONTH REPORTED
$4.65 BULK LINE
$4.29 AVERAGE REALIZATION
COST ADJUSTED AND RECALCULATED TO AVERAGE PERCENTAGE OF SIZES
AVERAGE ADJUSTED $3.79
REPORTED COST
AVERAGE REPORTED $3.71
FRESH MINED COAL
Cost per Ton in Dollars
Percentage of Production

COST OF PRODUCTION OF "COMPANY" COAL, DECEMBER 1917, TO MAY, 1918, INCLUSIVE

was granted. The calculated increase in cost due to this is shown in one of the charts, on which the increases for each operator are found by figuring from the payrolls, for the six months, the actual increase in pay which would have been given applying the Nov. 1, 1918, increases, and dividing by the six-months' tonnage of the colliery. This line, adjusted to per cent. of sizes, plotted on the chart and compared with the adjusted cost, shows an increase in cost of 74.1c. As this was

necessarily applied to the prepared and pea sizes 70.6c. of the total increase on these sizes was $1.05 per ton, which increase was allowed to balance the increased cost of labor.

Price Fixing

Except for the two increases to compensate for labor increases just noted and the reduction, Oct. 1, 1917, of the pea coal price, the anthracite prices are as fixed by the President on Aug. 23, 1917. The present realization, all companies and all sizes, including washery coal and both the labor increases, is calculated to average $5.13 per ton, while the bulk line of the chart shown, plus the November, 1918, labor increase would be $5.32.

The capital invested per ton output in the larger

TABLE II. AVERAGE AND BULK LINE COSTS OF WHITE-ASH COAL

Chart Number	Description	Costs, Averages Returned	Costs, Adjusted	Cost, 90 per Cent. Bulk Line
	Excluding Washery Coal:			
81	All operations, each colliery separate	$3.85	$3.91	$4.80
82	All company operations, each colliery separate	3.71	3.79	4.65
83	All independent operations, each colliery separate	4 37	4.36	4.97
86	All operations, each company operating two or more collieries consolidated	3.85	3.91	4.38
91	Including Washery Coal: All operations, each company operating two or more collieries consolidated	3.57	3.77	4.36

and better-equipped collieries ranges from $5 to $11, with an average investment of from $7.50 to $8.

The prices fixed by the President Aug. 23, 1917, are given in Table IV. No price was fixed on sizes smaller than pea, which was decreased 60c. per ton Oct. 1, 1917. There was a general increase of 35c. per ton. Dec. 1, 1917, and one of $1.05 per ton Nov. 1, 1918. Sizes smaller than pea were limited to a maximum of 50c. per ton below pea coal by order of Nov. 15, 1918.

The present fixed prices, Dec. 31, 1918, per ton of 2240 lb., f.o.b. mines, are given in Table V. Smaller than pea is not to be sold within 50c. of maximum pea-coal price. Thus the selling price of anthracite has been increased but 30.5 per cent. over the pre-war price,

TABLE III. AVERAGE PRICES RECEIVED FOR WHITE-ASH COAL

Size	Fresh Mined Coal Per Cent.	Fresh Mined Coal Average Price	Bank Coal Per Cent.	Bank Coal Average Price	Total Including Banks Per Cent.	Total Including Banks Average Price
Broken	6.8	$4.889	0.4	$4.416	6.2	$4.886
Egg	14.6	5.028	1.2	4.815	13.5	5.027
Stove	19.6	5.161	2.3	5.060	18.2	5.160
Nut	24.7	5.244	10.1	5.246	23.5	5.244
Pea	9.1	3.687	10.0	3.696	9.2	3.698
Total and weighted average prepared and pea	74.8	$4.959	24.0	$4.544	70.6	$4.947
Buckwheat	11.6	$3.342	21.4	$3.213	12.4	$3.324
Rice	3.2	2.482	14.9	2.452	4.2	2.473
Barley	4.9	2.231	27.5	1.767	6.8	2.074
Boiler	3.9	2.341	8.8	2.123	4.3	2.304
Screenings	1.6	2.202	3.4	1.555	1.7	2.162
Total and weighted average small sizes	25.2	$2.795	76.0	$2.339	29.4	$2.697
Grand total	100 0	$4.414	100.0	$2.868	100.0	$4.285

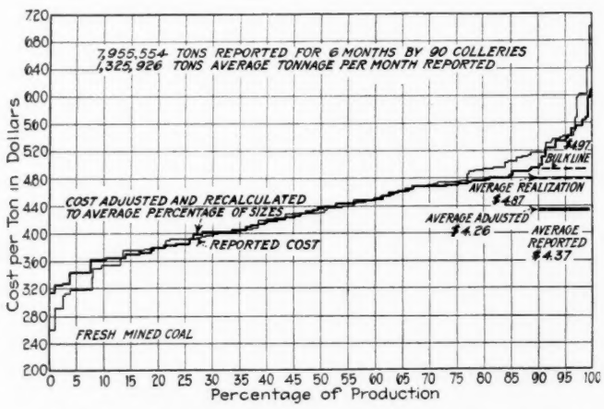
while the cost of production has gone up 52 per cent., the difference having been absorbed by the operators.

The average cost as reported for the six months, December, 1917, to May, 1918, inclusive, prior to the increase of Nov. 1, 1918, but including that of Dec. 1, 1917, is given in Table VI.

Depletion of Lands—The proper charge for depletion is admittedly a difficult question. Under the present (1917) income-tax law lands purchased since Mar. 1, 1913, may be depleted to return the cost price on exhaustion and lands purchased before that date may be depleted on their value as of Mar. 1, 1913. The second class may be divided into those operated on royalty by others than the owners, where the depletion accrues to the owners, and those lands directly operated by the fee owners.

In the case of royalty lands the value as of Mar. 1, 1913, is clearly the present value as a varying annuity of the annual amount of the royalties for the term of the life of the property and as this sum is not dependent upon the vicissitudes of mining the discount is properly at the going value of money in most cases not exceeding 6 per cent.

In the case of lands operated by the fee owners the value as of Mar. 1, 1913, should properly be calculated as the present value of the profits year by year to exhaustion. Unfortunately it is essentially impracticable to determine such a value as the profits are a widely varying quantity and impossible to forecast


7,955,554 TONS REPORTED FOR 6 MONTHS BY 90 COLLERIES
1,325,926 TONS AVERAGE TONNAGE PER MONTH REPORTED
Cost per Ton in Dollars
Percentage of Production
COST ADJUSTED AND RECALCULATED TO AVERAGE PERCENTAGE OF SIZES
REPORTED COST
FRESH MINED COAL
AVERAGE REALIZATION $4.87
AVERAGE ADJUSTED $4.26
AVERAGE REPORTED $4.37
$4.97 BULK LINE

COST OF PRODUCTION OF "INDIVIDUAL" COAL, DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

far into the future. We would suggest substituting for the profits the present normal royalty value of the property, as indicated by recent leases of similar lands, and determining the present value on the same basis as royalty coal. In this case the question of profits is minimized and it would seem that the discount rate might properly be taken at 6 per cent., leaving excess earnings to take care of the mining risk. As in the case of a sale which would fix the depletion charge, the purchaser would expect to be able to earn more than 6 per cent. on any investment involving a mining hazard, and a 6 per cent. discount based on royalty values would probably fairly represent a fair sale value.

In determining the probable life of a property consideration should be given to its past history as to output, its state of development, probable future output with normal conditions, and to the quantity of coal available on the property or property tributary to its development. As the present value of an annuity for 50 years is within 5 per cent. of the present value of a perpetual annuity, it is probably wise to limit the present value of a property to the present value of the probable out-

TABLE IV. PRICES FIXED BY THE PRESIDENT, AUG. 23, 1917

	White Ash		Red Ash		Lykens Valley	
	Company	Independent	Company	Independent	Company	Independent
Broken	$4.55	$5.30	$4.75	$5.50	$5.00	$5.75
Egg	4.45	5.20	4.65	5.40	4.90	5.65
Stove	4.70	5.45	4.90	5.65	5.30	6.05
Chestnut	4.80	5.55	4.90	5.65	5.30	6.05
Pea	4.00	4.75	4.10	4.85	4.35	5.10

put of say 50 years, regardless of the total tonnage or life of the property.

Acreage which is not estimated to be mined within the 50-year period should be carried in an investment account not subject to depletion and, when opened, treated as a new property.

The present value of property with less than the maximum life above indicated should be based on its probable life resulting, of course, in a higher depletion charge for short-lived properties.

As an example, the present value per ton assuming regular output to exhaustion would be for 10 years' life 74 per cent. of the royalty rate, for 25 years 51 per cent., and for 50 years, 31½ per cent., the suggested limit.

Then, assuming 50 years' reserves and 25c. per ton royalty rate, the present value would be 7.9c. per ton, and with a 10c. royalty rate but 3.15c., while with a rate of 40c., a fair present average anthracite

TABLE V. FIXED PRICES, DEC. 31, 1918

	White Ash		Red Ash		Lykens Valley	
	Company	Independent	Company	Independent	Company	Independent
Broken	$5.95	$6.70	$6.15	$6.90	$6.40	$7.15
Egg	5.85	6.60	6.05	6.80	6.30	7.05
Stove	6.10	6.85	6.30	7.05	6.70	7.45
Chestnut	6.20	6.95	6.30	7.05	6.70	7.45
Pea	4.80	5.55	4.90	5.75	5.15	5.90

royalty rate, the present value per ton would be 12.6c. per ton for a fair average for depletion where reserves are at least equal to 50 years' probable mining and increasing to 20.4c. for 25 years' reserves.

Depletion and Capital Charges—In general, it is our opinion that all plant and all opening and development charges less the value of coal produced during this period up to the time when the mine is sufficiently opened and developed to be able to maintain a normal

TABLE VI. AVERAGE COST, DECEMBER, 1917, TO MAY, 1918

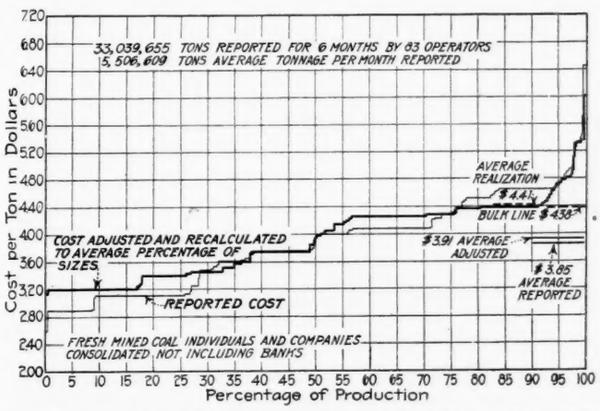
	Fresh Mined Coal, 35,256,550 Tons Cost per Ton	Washery Operations, 3,431,916 Tons Cost per Ton	Total Including Washeries, 38,688,466 Tons Cost per Ton
Labor	$2.593	$0.687	$2.423
Supplies	.616	.260	.584
Transportation, mine to breaker	.004	.007	.004
Royalty, current	.153	.102	.148
Royalty, advance	.002	.....	.002
Depletion	.099	.077	.097
Amortization of cost of leasehold	.014	.024	.016
Depreciation	.091	.086	.090
Pro rata suspended cost of stripping	.023	.....	.021
Contract stripping and loading	.009	.....	.009
Taxes, local	.054	.034	.052
Insurance, current	.016	.014	.016
Insurance, liability	.058	.018	.055
Officers' salaries and expenses	.030	.019	.029
Office salaries and expenses	.048	.024	.045
Legal expenses	.005	.003	.005
Miscellaneous	.026	.023	.026
Total	$3.841	$1.378	$3.622
Increase over May to November, 1917	$0.764	$0.365	$0.719

production should be charged to capital and be subject to depreciation, and all charges for extensions including plant and development work necessary to maintain capacity should be charged to operating expense.

In the case of new development or plant designed to increase capacity or to materially reduce operating expense, a new development account should be opened and the cost of providing such increased output be charged to capital account.

The depreciation account should be so arranged as to extinguish the capital charge against any item of plant or development when such item is either worn out or ceases to be useful to the operation, and it might be well to classify into groups the various divisions of capital charges assigning to each group its probable average life and proper depreciation charge.

Repairs and renewals of parts should be charged to operation, but the life of plant should be figured considering such repairs and minor replacements. For instance, repairs and renewals in a breaker either to machinery or structure should be charged to operating expenses, but on its extension or replacement by a new structure the excess value considering depreciation of the new structure over the old which it replaces should


33,039,655 TONS REPORTED FOR 6 MONTHS BY 83 OPERATORS
5,506,609 TONS AVERAGE TONNAGE PER MONTH REPORTED
AVERAGE REALIZATION
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Cost per Ton in Dollars
Percentage of Production

COST OF PRODUCTION OF BOTH "COMPANY" AND INDIVIDUAL COAL, DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

be capitalized. Similarly, the retimbering of a shaft or main tunnel should be charged to operating cost.

The original capital charge against any improvement should be depreciated so as to be wiped off the books on its abandonment whether due to age and deterioration, to lack of further usefulness due to the exhaustion or abandonment of the mine, the expiration of the leasehold, or to other causes.

Extraordinary Expense Account—Large items of expense properly belonging in operating cost but which would so affect monthly costs as to invalidate comparisons may be put into an extraordinary expense account and this distributed annually into the operating expenses.

Insurance and Taxes—Fire insurance and workmen's compensation should be pro-rated with the monthly costs as should local taxes. An insurance fund should also be maintained to provide against mining accidents such as fires, explosions, irruptions of large bodies of water with resulting flooding, extensive squeezes and such like accidents which cannot properly be absorbed into operating expense.

necessarily applied to the prepared and pea sizes 70.6c. of the total increase on these sizes was $1.05 per ton, which increase was allowed to balance the increased cost of labor.

Price Fixing

Except for the two increases to compensate for labor increases just noted and the reduction, Oct. 1, 1917, of the pea coal price, the anthracite prices are as fixed by the President on Aug. 23, 1917. The present realization, all companies and all sizes, including washery coal and both the labor increases, is calculated to average $5.13 per ton, while the bulk line of the chart shown, plus the November, 1918, labor increase would be $5.32.

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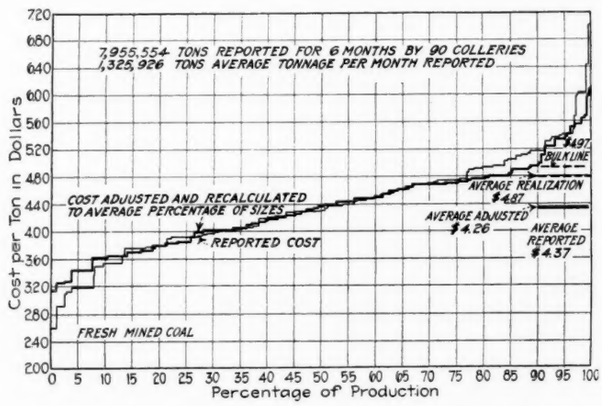

COST OF PRODUCTION OF "INDIVIDUAL" COAL, DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

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Egg	4.45	5.20	4.65	5.40	4.90	5.65
Stove	4.70	5.45	4.90	5.65	5.30	6.05
Chestnut	4.80	5.55	4.90	5.65	5.30	6.05
Pea	4.00	4.75	4.10	4.85	4.35	5.10

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TABLE V. FIXED PRICES, DEC. 31, 1918

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	Company	Independent	Company	Independent	Company	Independent
Broken	$5.95	$6.70	$6.15	$6.90	$6.40	$7.15
Egg	5.85	6.60	6.05	6.80	6.30	7.05
Stove	6.10	6.85	6.30	7.05	6.70	7.45
Chestnut	6.20	6.95	6.30	7.05	6.70	7.45
Pea	4.80	5.55	4.90	5.75	5.15	5.90

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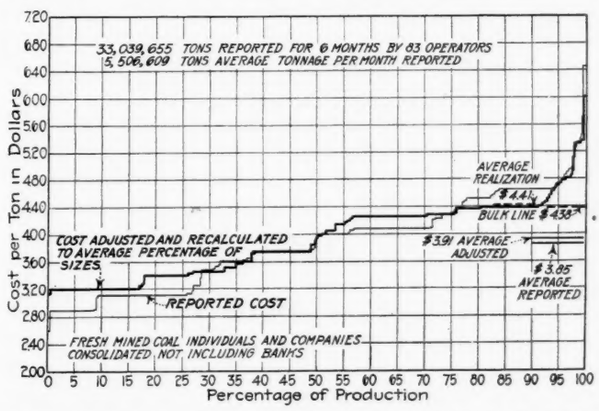
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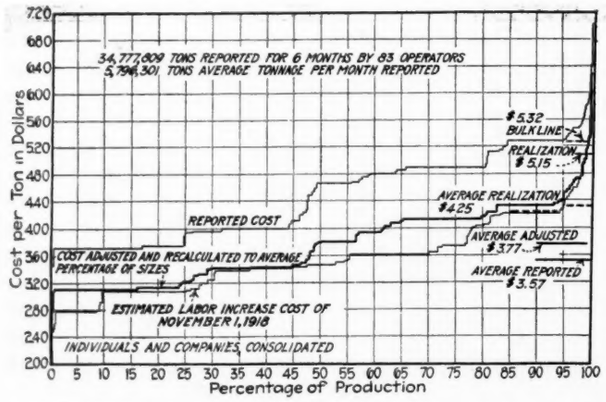
Office salaries and expenses	.048	.024	.045
Legal expenses	.005	.003	.005
Miscellaneous	.026	.023	.026
Total	$3.841	$1.378	$3.622
Increase over May to November, 1917	$0.764	$0.365	$0.719


34,777,809 TONS REPORTED FOR 6 MONTHS BY 83 OPERATORS
5,796,301 TONS AVERAGE TONNAGE PER MONTH REPORTED
$5.32 BULK LINE
REALIZATION $5.15
AVERAGE REALIZATION $4.25
REPORTED COST
AVERAGE ADJUSTED $3.77
COST ADJUSTED AND RECALCULATED TO AVERAGE PERCENTAGE OF SIZES
AVERAGE REPORTED $3.57
ESTIMATED LABOR INCREASE COST OF NOVEMBER 1, 1918
INDIVIDUALS AND COMPANIES, CONSOLIDATED
Cost per Ton in Dollars
Percentage of Production

PRODUCTION OF ANTHRACITE, INCLUDING BANK COAL, FROM DECEMBER, 1917, TO MAY, 1918, INCLUSIVE

Income and excess profits taxes are chargeable against profits and are not proper items of operating expense.

Stripping Costs—The cost of stripping overburden should be kept in a suspense account and charged against the coal as produced. This requires a reasonably accurate estimate of the coal to be produced by stripping made from proper borings or in the case of worked-over areas, from mine data, and as such an estimate is an essential preliminary to any properly conducted stripping operation, there should be no difficulties in properly handling this account.

General—It should be understood that the foregoing accounting suggestions are the personal opinions of the author and have not been approved by any Government department.

Conclusion—The anthracite cost investigation supplements the bituminous price fixing previously described and shows, probably for the first time, the actual range of anthracite costs. The entire work is based on the costs reported to the Federal Trade Commission by the anthracite operators. The analysis and study was made by the Engineers Committee of the United States Fuel Administration, Cyrus Garnsey, Jr., J. H. Allport and myself, with the able assistance of Capt. R. H. Vorfelt, U. S. A., detailed temporarily to the Fuel Administration as Director of Investigation.

Cause of Flare-Up Undiscovered

Chief of Department of Mines and His Assistants Trying to Ascertain What Was Responsible for Recent Catastrophe in Baltimore Tunnel

As usual with accidents in the mines it is extremely hard to find the actual cause of the Baltimore tunnel disaster. Seward E. Button, the chief of the department of mines, with six state mine inspectors, two members of the United States Bureau of Mines and several company officers are trying to ascertain exactly what ignited the powder—a current of electricity or a miner's lamp or whatever else. The number of men killed now stands at 95. The inquiry has been delayed because of the condition of certain of the witnesses who were unable to attend the inquiry and give testimony.

The chief of the department of mines gives four possible causes of the disaster. (1) That a bar carried by one of the men in the car where the flare-up first occurred touched the feed wire. (2) That a keg of powder touched the wire. (3) That as pipes were found in the cars, and lighted tobacco, and as the men had lighted lamps, the powder may have been ignited by some such sort of flame. (4) That as an electric feed wire fell on the rail 2500 ft. inside the mouth of the tunnel, the current may have come back through the cars and ignited the powder. Mr. Button states that for the first three conclusions there is a lack of evidence, but, of course, a lack of evidence does not prevent a thing from being true. The chief seemed, at least at one time, to favor the hypothesis that the flare-up was consequent on the fall of the electric feed wire.

ENTRANCE TO MINE WHERE FLARE-UP OCCURRED
Accident was 150 ft. inside of entrance

The inspector arranged to drop the wire at the point at which it fell in the accident of June 5. It was allowed to drop on two rails though it fell on but one when the fatal ignition occurred. A 13-car trip was put in the same position as on the morning of the accident. A keg of powder was placed in the fourth car from the rear and the current was turned on. No explosion or ignition occurred, nor did anything happen when the keg was placed in contact with iron bolts or even rested on the drawbar of the car. The failure to explode or ignite the powder in the keg made the inspector doubtful of the fallen-wire theory.

He Wanted to Be There

Some years ago a foreman's word was law. This petty official ruled with an iron hand, and there was no "comeback." An inside driver once asked his boss if he could get off on the first of the month, which was then about two weeks away.

The answer was a short, "No!"

The driver made no comment, but in another week again asked the boss if he could be off on the first of the month.

This time the answer was the same as before, only a little louder. The driver walked away and the boss, being a curious man, called after him and wanted to know what the h—l he wanted to be off for.

"Well," answered the driver, "you see, I'm going to get married then, and I just sort of wanted to be there."

In a section of West Virginia it is said the mine cars were so large that they were often run over the Norfolk & Western R.R. The coal company got to making them so big that the railroad company protested, alleging that they couldn't get them through the tunnels. All of which sounds like the sarcastic remark of an operator in a field where owing to the thin coal and poor roof a large car cannot be used.

Senator Smoot Advocates That Government Own Coal and Oil Lands

"We must have either leasing or ownership," said Senator Smoot in introducing his oil and coal land leasing bill. "My bill provides only for the leasing of these lands from the Government." Senator Smoot long has been an advocate of permanent Government ownership of Government coal and oil lands. He was an important factor in defeating the last leasing bill when it was about to become a law on account of the fact that it allowed the sale of coal lands. Under the provisions of Senator Smoot's bill, 50 per cent. of all money received under the measure is to be paid to the state in which the land is located. The money must be used, however, for the construction and maintenance of roads and for schools.

Proposes a Government Coal-Inspection System Through Bureau of Mines

Legislation providing for Government fuel inspection will be introduced in both the Senate and House in the near future. The bill will direct the Secretary of the Interior to establish through the Bureau of Mines a fuel inspection system and will carry an appropriation of $600,000 for that purpose. The action is being taken by a group of legislators because demands have been made on them for some form of coal inspection that will at once assure to the consumer a grade of coal which he pays for, protect the interests of those preparing clean coal, and without discouraging the mining of poorer grades of coal, will exert an influence toward good coal preparation, especially in time of coal shortage.

The proposed coal-inspection system contemplates as a salient feature public advice as to the quality of coal as shipped. The force depended upon to produce results is a public statement of the facts. For this purpose the machinery for accurate sampling of full carload lots is necessary. The Government now possesses facilities for analyses and publication.

It is proposed that each mining company set its own standard of quality, consistent with the particular seam, preparation and market which the business affords, and that the Government shall publish such standard and certify as to whether such standard is being maintained by the mining companies. Such work would not replace inspection by the mining companies. It would not certify as to the quality of each and every shipment, but it would inspect and sample at irregular intervals a sufficient number of cars of coal as shipped to indicate whether the declared standard of the mining company was being maintained.

Mines entering the system would be privileged to advertise that their product was from a mine whose standard of preparation was certified to by the Government. In case coal shipments were sub-standard the mine would be advised of the fact. If the condition continued, the facts would be given publicity and the mine, to retain a place as a certified mine, would be required to declare a new and different standard and one which its product could meet.

Mines entering this system would agree to allow shipments to be sampled enroute at sampling stations and stand any added expense of transportation and handling incident thereto. All analyses would be published from time to time giving accurate information about American coals. Mines need not come into this system, but there would be manifest advantages in being on a Government approved list which would gradually increase the number using the service.

Important Results of Cleveland Coal Convention Summarized

George H. Cushing, the managing director of the American Wholesale Coal Association, sums up the more important results of the Cleveland convention as follows: "The determination of the association to limit its membership to those who are willing to maintain the highest moral standard in their business dealing. The adoption of a platform. The determination to fight for the reinstatement of civil laws relative to reconsignment and demurrage. The determined stand against government ownership or detailed supervision of coal. The stand for the return of the railroads to private ownership, stripped of coal connections. The adoption of local self-government of the Wholesale Coal Association by having each district nominate and elect its own directors."

The employees of the Bureau of Statistics of the Fuel Administration have presented C. E. Lesher, the chief of the Bureau, and Taylor Thom, Jr., the chief of the planning section, with watches as tribute of their appreciation and esteem.

Joint rail and water rates on coal from Birmingham to tidewater by way of the Government barge line on the Warrior River, have been announced. Equipment for regular service has been provided, and coal already is moving from the Alabama fields to Mobile and New Orleans by the water route.

EDITORIALS

Impermanence of Bench Marks

ENGINEERS like to shut their eyes to the impermanence of bench marks, but it is a fact nevertheless that these monuments are not to be relied on for any great length of time. Especially are those below ground subject to change. When the coal sinks, as it does, into the clay, and the clay is heaved between pillars, there is no certainty in the levels of points in the floor or in the ribs.

When the point is in the roof conditions are but little better, for settling coal involves a sinking roof. Then, again, the drawslate in which the plug too often has to be driven is apt to sag and change the level or—a small error—the plug expands and either pushes itself downward with a purchase on the point or is wedged downward in its attempt to relieve pressure on the sides. Where the plug is not driven so hard as to fathom the bottom of hole the swelling plug is not likely to be forced out by its increase in length. However, a plug thus imperfectly driven is likely to be hammered further in by some zealous trapper-boy or miner. Moreover, when the hole is not tapered the plug is not likely to work out by a diametral expansion. As a rule, as holes are drilled and not cut with a pick so there is no taper and the plug remains in place.

As stated, the worst trouble underground with level plugs driven in the roof arises from a general subsidence. Suppose a point inside the mine is found on leveling to be of the same elevation as a point at the entrance to the mine. Grant then that the latter point descends 6 in. before the next extension of levels occurs, and in the extension that the levelman finds another point in the mine at the same level as the point just mentioned. The level of this second mine point would be recorded as the same as the point at the mine entrance, though it would really be 6 in. lower. Similarly, every extension would increase the recorded elevation of points within the mine. A truly level mine would thus be recorded as having a general gradient downward toward the entrance. After several levelings the mistake would be not only measurable, but even important.

Taking points in the floor the leveler would represent the mine as lower, instead of higher, than it really is; and as movements of the floor are more rapid the error would be greater. Extension of levels from bench marks set in the floor is hopelessly inaccurate, so it should not be considered. The floor will often heave without any roof pressure whatever. Certain constituents in the clay of the mine will expand and arch upward long before the clay will begin to squeeze from under the pillars. This lifting will occur before extension of levels takes place and will consequently vitiate results.

Only roof-points are fitted as bench marks for extensions in levels. The roof-points in entries, if not driven in a drawslate, do not materially change level till the acreage around them is partly mined out. If the extension is made before that time it is likely to be fairly accurate. The levels should always be extended from plugs in such headings as are being driven in the solid away from the larger earth movements.

Points on the surface are subject to subsidence and, if badly chosen, may be wholly inaccurate. These errors will occur whether the bench mark is on a stake or cut in the stump of a tree. In fact, engineers have all too much faith in a stump bench mark which may be affected by mine subsidence, earth movements, frost, growth and wind. The effect of growth has, we believe, never been carefully investigated. An inquiry into that matter might be of value to the industry.

We are rarely entitled to demand an immutable bench mark. Most of us record to hundredths when our base for level extensions is incorrect by tenths and even by whole feet. We are justified, however, for the comparative levels of nearby points are important even when we do not know the true sea level or the relative levels of two points remote from each other. A jump of 25 ft. in a railroad survey in central Pennsylvania would have made transportation on that line impossible, yet the levels of all points in that part of the state thirty years ago were being calculated on a basis of 25 ft. in error.

Standardization of Mining Equipment

THE great economies to be effected through using only standardized equipment around a mine are perhaps not fully appreciated, though there has been a marked tendency in this direction during the past decade. This uniformity should extend beyond the mere procedure of purchasing the same kind of mining machine, pump or other apparatus; it should be an interlocking arrangement so that the weight of the mine locomotive, mine cars and other equipment shall be in correct proportion to the size of the mine rails, frogs and switches.

The necessity for carrying duplicate parts for a number of machines or pieces of apparatus will be a serious factor where there are many different varieties of machines used. Thus, for instance, in a mine using a number of pumps, a certain lot of spare parts that are subject to considerable wear, such as water and steam valves and piston rings, must be kept on hand; and where these pumps are of different types, it will be necessary to multiply this number of spare parts by the number of different makes used; and, in order to reduce the number of parts to the minimum, it is probable that the supply department would not order some parts that it might otherwise do if it was not necessary to obtain such a large number of them. Were these pumps all of the same size and type, a good plan would be to order spare parts sufficient to make one complete pump with the possible exception of some of the major portions, such as the base castings.

It is especially necessary to carry heavy supplies at the more remote mines, where deliveries are liable to be slow. It is obviously poor business judgment to risk a complete shutdown of mine operations because of the lack of $10 or $15 worth of spare parts for some machine.

The stocks on hand in a supply room of big producing companies will vary from $25,000 to $60,000 and sometimes be even larger. The interest on an investment of even $60,000 is sufficient to pay the salary of a high-grade man who might be capable of systematizing and standardizing equipment to such an extent that this could be reduced by fully one-half.

On the other hand, care must be exercised not to carry the duplication of spare parts to extremes, especially on permanent equipment such as large hoisting engines. Developments in mechanical lines in recent years have been rapid, and spare parts on apparatus of this kind may quite possibly become obsolete before put into use.

Measuring Coal by Gold

EVERY man is prone to regard the particular industry in which he is engaged as being basic, fundamental and essential to the well-being of mankind. Thus the farmer asserts that the world is dependent upon him for food. The iron producers in like manner are positive that civilization would come to an abrupt standstill were it not for the steady production of ferrous metals and alloys. And so on *ad infinitum.*

Most nations of the world are on a gold monetary standard. Ever since commercial transactions passed beyond the art of barter, the yellow metal has been the yardstick by which the value of commodities has been measured. Its production has been an attractive calling ever since man emerged from the Stone Age, or possibly even before.

It is but natural then, in comparing one industry with another, to make the gold production a standard of comparison. It is interesting to thus place the coal output beside that of gold production and see how the one measures up with the other.

During the year 1918, the gold production of the world has been estimated as amounting to $377,300,000; that of the United States was taken by the same authority as being $68,493,500.

Reports of actual coal production and the value thereof in the United States during 1918 are not yet available, and estimates must therefore be employed. It is reasonably certain, however, that these estimates are fairly correct; and it is not believed that actual figures of production when available will vary from them by more than a few per cent.

The estimated bituminous-coal production of the United States during 1918 amounted to roughly 590 million tons. Now, assuming that this was sold at the mine mouth at the average price of $2.30 per ton, which is probably conservative, its value amounted to $1,357,000,000. Adding to this the value of the 99½ million tons more or less of anthracite, or $317,522,181, we have, neglecting the last three figures, $1,674,522,000. Now, dividing this figure by $377,300,000 we get 4.4. Again dividing it by $68,493,500, or the value of the gold production of the United States (including Alaska), we get 24.4.

Thus it is seen that the value of the coal production of the United States is roughly 25 times that of its gold production, or that the coal production of this country is worth on the open market roughly 4½ times as much as all the gold produced from all the mines of all the world. This is a fact that the general public only dimly visualizes because it is so often bitter in buying gold stock and so seldom puts its money into coal securities.

A Bottle with Two Necks

AT NO part of the mine does the air travel so fast as in the mine entrance and main return, whether that entrance or return be a drift mouth, slope or shaft. It is these two points, therefore, that quite largely influence the resistance of the mine to the ventilating current. Further underground the air is split into a multitude of more slowly moving currents, and the friction is accordingly reduced.

The amount of air to be delivered is not allowed in many cases to determine, as it should, the size of the intake and return. This is largely fixed by a consideration of the use of these passages for transit. We seem to imagine that the air will force its way through these orifices if only a fair way is provided beyond.

In the passageways leading to the fan especially, there are often sharp angles. Where the flows from well separated districts return into a common current no attempt is made to prevent a conflict at the mouth of the single and narrow airway which, vastly too small for the service, must carry the air to the fan.

We overlook the fact that the air is provided with such narrow quarters it must be traveling fast and should be guided gently to its destination by well-shaped airways. We can give the air all kinds of harrowing experiences where the speed of travel is relatively slow, but where the air is moving rapidly the stream lines should be straight and undisturbed.

Unfortunately as we approach the surface the roof gets bad, and the exigencies of continued maintenance demand a more carefully protected roadway. Hence we tend to make the roadways narrow and fortify them with timber. The air eddies around in these narrow passages, and the friction is much greater than it would be in passages of the same size and carrying the same current if only the eddying were eliminated. Concreting such roadways by forms or with the cement gun is therefore a good means of increasing the ventilating capacity of the airway and hence of the whole mine; and it serves to prevent the airway, not to speak of the roadway, being blocked by ice in the winter.

It is perhaps unfortunate that we cannot see the air and so realize visually what a waste of energy there is when a ventilating current is churned up by a line of timber-set riffles. But what we do not see and know may hurt us most severely, and it is necessary for us to realize that we will not get efficient ventilation if we trip our air as it enters the mine by a lot of crossbars, legs and laggings and trap it as it leaves the workings by a series of similar resistances. A concreted shaft is not only safe and durable, it is a money saver in ventilation. No piping or cabling which goes lengthwise of the tunnel or shaft resists the air like the transverse timbering by which these airways are quite usually kept open.

Drunken and disgruntled men rail at the capitalistic class. Fortunately, they rail also at other people, including those in their own families. They are therefore by no means popular, and their own selfish actions frequently are the best antidote for the doctrines they espouse. Do the wife, children and neighbors of an inebriate, or even a shiftless doctrinaire, believe that all the evil in society rests with the men who provide that inebriate or doctrinaire with what little work he is willing to do and what little pay he is industrious enough to earn? For our part, we think not.

THE LABOR SITUATION

EDITED BY R. DAWSON HALL

General Labor Review

Up to the end of March of this year, according to the reports of the Immigration Service, no great exodus of foreigners had taken place. In the month of the armistice, 4530 more aliens came to the United States than departed, but during the month of February the alien departures outnumbered the alien arrivals by 424. In March the difference had risen to 2014, the number of those returning, by this figure, exceeding the number of those arriving.

In brief, the number of aliens arriving from the beginning of the month of the armistice to the end of the month of March exceeded the number of those returning by 7655. But the arrivals are mostly of the commercial classes and the exodus is of laboring men and is evidently gaining in strength as the months pass. It would be much larger if there were more accommodation. According to the *Nautical Gazette*, the bulk of these aliens seeking traveling accommodation are Southern Europeans — Portuguese, Spaniards, Italians and Greeks, with some Poles and Bohemians.

HOWE SAYS ABOUT FOUR MILLION WILL RETURN

Frederick C. Howe, U. S. Commissioner of Immigration at the port of New York, says: "The middle European peoples, especially the Poles, are going back for nationalistic reasons; the Bohemians the same. The Russians and Hungarians think that land is going to be very cheap over there. They have heard that the land in Russia and Hungary has been nationalized, and it is expected that it will be nationalized in Germany and Austria, too.

"I estimate—it is just an estimate—that a minimum of 4,000,000 people will probably go back to Europe just as soon as they can get transportation. Sometimes I am inclined to think that the number will be greater. Many Austrians, Hungarians and Russians, and to some extent Scandinavians, are going back because they feel they are not wanted here. They feel that America is hostile to them. I have heard that deportation clubs have been organized among these people, but I don't know whether it is true."

In the five months, November and December, 1913, and January, February and March, 1914, the United States received 261,595 more aliens than it lost. The same five months in 1918 and 1919, as stated, showed an increase of 7655. The difference shows how we have failed for a long time to obtain our former supplies of man power.

EMIGRANTS CAN'T GET BEYOND NEW YORK CITY

The working men are moving toward the ports but they find it difficult to secure transportation, and it is this fact that is delaying their exit. With an easing in transportation facilities the movement will be more rapid and laboring men will become more scarce. Thus when exporting becomes possible, the men to make the material to be exported become lacking. But after all, as far as coal is concerned, the problem of exports will be, not so much lack of men and hence of coal, though both may be grievously short, but lack of a sufficiently low schedule of shipping rates to make coal shipments feasible.

The mine workers of the West End Coal Co., Nanticoke, Penn., are on strike because the company refuses to adjust certain grievances of the men. The way to rectify matters of the kind is through the conciliation board of the region, after the local representatives of the mine workers and operators have failed to agree, but the 1500 men at this colliery will not have it that way; they have said what they want and will have it whether in accord with their agreement or not.

On June 2 the mine workers at the Creighton coal mine in Allegheny County, Pennsylvania, went on strike to compel a recognition of the union. Another mine in the same district has gone on strike and for the same reason. There are about 500 men idle in consequence. Five men were riding an electric locomotive on a trestle that spanned a deep ravine at the plant of the Creighton Coal Co. (which trestle joined two mine openings) when a shot from a man in ambush killed Andy Loobek of Tarentum. Another shot passed through the hat of a second man. Three other shots were fired, but the underbrush was so thick that the assassin could not be seen. It is thought that he is a negro, for one was seen recently with a rifle near the mine.

The Canadian royal commission on industrial relations held its Sydney, N. S., session on June 6, taking testimony from 13 persons. F. W. Way said the men were extremely discontented with what he termed the low wages, long hours, high prices, opposition to collective bargaining and inadequate housing which the mine workers of the province have to face. He stated that the lowest wage paid was $3 for a 12-hour day and that wages were from 25 to 30 per cent. lower than in Western Canada.

The lowest wage in the mine he declared was $2.90 per day. He added that men are now employed 11 to 13 hours daily and that every second week they work a 24-hour shift with the result that they break down physically and morally. Sixty per cent. of the men work on a 12-hour shift and the shortest workday is 10½ hours. He declared that the families of the men employed by the Nova Scotia Steel and Coal Co. were living in houses of from three to five rooms for which they were paying $5 to $6 per month. They were willing to pay more money, even double the rent, for better accommodation.

DOMINION COMPANY'S LOWEST PAY, 30C. AN HOUR

General Superintendent Rice of the Dominion Steel Corporation said the lowest price paid was 30c. per hour. The company was unable to put on three shifts of 8 hours, because it would add 30 to 50 per cent. to the cost of production. Rents have not been increased for several years except in the better class of houses. Of the houses of the Dominion company 120 are renting for $4 per month.

A. J. Tonge said that the minimum wage is $3.11 for an 8-hour day and that the average daily wage is $4, although contract men get as much as $50 per week. Coal at the bankhead cost more than double what it did in 1914.

In France a strike of the Federation of Miners took place on June 16. It seems to involve all the mine workers of that country. The general secretary of the federation said that the proposals made by M. Colliard, Minister of Labor, and M. Loucheur, Minister of Reconstruction, were unsatisfactory. The men want an eight-hour day to include the time when they are being lowered into the mine and hoisted to the surface—two periods of about 20 min. each—and also a meal time averaging 30 min. The time of actual service would be reduced to 6 hours and 50 min. The Government supported the demand in general but would not accept the specific statement of June 10 which read "Eight hours, including meal time, to be counted from the time the first man goes down till the time the last man comes up."

The Governmental authorities apparently thought the men would come out as they went in the mine and the loss of time in reaching their work would be only 20 min. They demurred when they found out that the men would start work together and quit work together and have to wait at the shaft mouth, morning and night, making the loss of time 40 min. for hoisting and 30 min. for lunch or three hours and 30 min. per day of three shifts. The mine workers voted at their Marseilles convention 373 to 120 to demand the execution of the contract as presented.

DISCUSSION BY READERS

EDITED BY JAMES T. BEARD

Remarkable Pressure Chart

Letter No. 1—That is certainly a remarkable chart shown in *Coal Age*, Apr. 17, p. 728, and it is no wonder that W. F. Harry is asking for the opinions of others regarding it. As stated in the editorial reply, the chart is not a true representation, there being at least three inconsistencies, as I view the matter.

In the first place, it is only reasonable to assume that the load carried by this power station was a fairly uniform one, from the indications of the pressure line during the day. But, even with a uniformly constant load, there would appear to be no reason why the chart should show the straight line indicated for the nightshift, from the statements of the nightman.

In reply to this inquiry, the editor suggests that the chart was spiked. That may be the case or the night fireman, if so disposed, could turn the chart around at the beginning of his shift, or when it showed a good pressure in the boiler, and having done this remove the chart from the gage and replace it again at the close of the shift.

If this was done, as I have described, the nightman could bank his fires and allow the steam to go down, by that means saving the 30 per cent. of coal during his shift. The saving of this amount of coal is the second inconsistency to which I have referred. Such a saving is incredible. Unless the nightman is an exceptionally good fireman and the daymen both very extravagant in their methods of firing, it would be impossible to show this difference in the amount of coal burned. Indeed, it is my opinion that such a difference could not exist under normal conditions, in the average run of firemen.

OFFER TO INCREASE PLANT EFFICIENCY DECLINED

This reminds me, however, of a little incident in my own experience. Having observed some of the extravagant practices and the losses resulting therefrom in a certain plant where power was being generated, I submitted a proposition to the management to make a few changes in the arrangement and accept as my pay the saving in coal that resulted from the proposed changes. The offer was a good one from my own and from the operator's standpoints, respectively, but it was declined, as many such offers are, through indifference or ignorance, as the case might be.

The third inconsistency, regarding this chart and the claims made, has reference to the statement that the fires were cleaned three times during the nightshift of 10 hours. To clean the fires three times in a single shift is much out of the ordinary, in the usual practice of firing. Furthermore, everyone who has fired a boiler knows that more coal is needed when a fire must be cleaned, as some of the unburned coal will pass through the grate and be lost in the ashpit, while the furnace and boiler will be cooled by the inrush of air through the firedoors.

This claim of cleaning the fire three times makes all the more unreasonable the statement that 30 per cent. of the coal was saved during that shift. Again, the necessity of cleaning fires so frequently would indicate that the load carried was much greater at night than during the day, which does not conform to the showing of the chart for that shift.

In closing, permit me to suggest that Mr. Harry should give the day fireman another job, for a week, and let his efficient nightman take the dayshift. Then lock the gage and attend to replacing the chart himself. Having done this, it would be interesting to learn what results the nightman would be able to show when working on the dayshift. S. D. HAINLEY.

Osceola Mills, Penn.

A Modified Longwall System

Letter No. 3—Referring to the letter of W. H. Luxton, *Coal Age*, Apr. 24, p. 764, permit me to draw attention to two statements in his closing paragraph. First, he suggests that "The depth of cover should not be less than 200 ft. to obtain the best results in longwall working." He follows this with the statement that "The principles involved in this method are those that must ultimately be applied to work such seams."

It would certainly be of interest to know if Mr. Luxton has ever had any practical experience in working longwall under a light cover, which induces him to make the suggestion that the success of this method depends on a depth of cover not less than 200 ft. in thickness. In the article that started this discussion, Apr. 27, p. 395, F. A. Pocock states that the cover of the seam, in the method he has proposed, is only 80 ft. in thickness. Now, from Mr. Luxton's point of view, the longwall method of mining could not be successfully applied in that case.

It would seem only fair to Mr. Pocock to ask that others who have had experience in working the longwall system under a light cover should favor us with their opinions in regard to applying this method of mining to shallow seams. It is for the purpose of inviting the expression of opinion on this matter that I have asked the privilege of sending a second letter on this subject, which is one that has always been of interest to me.

LONGWALL POSSIBLE UNDER SHALLOW COVER

Personally, I have no hesitation in stating that there is, to my mind, no reason why the longwall method of mining cannot be successfully applied under the 80-ft. of cover mentioned in Mr. Pocock's article, provided only that the strata overlying the coal is such as will make a good roof for the purpose. I could cite instances where hundreds of acres of 3-ft. coal have been worked successfully on the longwall system, and the cover, in some places, did not exceed 60 ft. in depth, while the thickness of the coal varied from 20 in. to 5½ ft.

Allow me to cite just one important illustration, regarding the applicability of the longwall method of mining to a far more difficult problem than that presented by Mr. Pocock. It has reference to the working

of the Pittsburgh seam, with which most *Coal Age* readers are thoroughly familiar, but which they are prone to regard as not being adapted to longwall work. Let me say, here, that I have demonstrated the falsity of this conclusion and can only attribute it to their lack of experience in longwall methods, which is sure to result in failure. Success in longwall requires a thorough experience and training in that work.

My reference to the working of the Pittsburgh seam by longwall relates to an instance where the thickness of the seam varies from 3 ft. 6 in. to 5 ft., the coal being overlaid with 1 ft. of slate, above which was 3 ft. 6 in. of "rooster coal." The seam was worked successfully on the advancing system of longwall.

Allow me to add that the work was carried forward in a proper and systematic manner. Mr. Pocock's proposition appeals to me as one that can only be worked successfully by the longwall method that he has proposed and which promises to produce a quick output and has due regard for the future life of the mine.

McKeesport, Penn. ANDREW ORR BAIN.

Safe Handling of Explosives

Letter No. 1—The reading of the "Safety Letter" of the Consolidation Coal Co. sent to its safety committee and which appeared in *Coal Age*, May 8, p. 874, reminded me of a sad incident that befell a miner by reason of which he is now bowed down in grief and sorrow, as the result of his own negligence in the use of explosives.

Returning home one morning after working an all-night shift in the mine, the man brought with him a quantity of gelatin dynamite that had become frozen. Placing the explosive in the oven of the stove in the kitchen of his home, for the purpose of thawing out the frozen dynamite, the miner went outside to do a few chores, which was his regular custom. He stayed a little longer than he had expected and when about to return was started by the loud report of an explosion in the house, one side of which he beheld blown to atoms.

The explosion killed his wife and three-year old daughter who were both in the kitchen at the time. The title of the safety letter to which I referred is "Leave Your Explosives Outside." Had this man obeyed that injunction and not taken the explosive into his house, he would not now be suffering from the sad recollections that fill his mind, today.

ESTIMATING CHARGES FIRED PER LIVES LOST

When one thinks of the tremendous quantity of explosives that are being used today, in the mining of coal, it is astonishing that the number of accidents from this source are so few. In the anthracite region, where the coal is blasted off the solid, it is nothing unusual for a miner to use 25 lb. of powder, in the performance of a single day's work. Assuming the average charge of powder placed in a hole is from 2 to 3 lb., it would appear that an anthracite miner would fire from eight to nine shots, in a single shift.

Now, if there are 50,000 men employed in the anthracite mines, cutting and blasting coal, and each man prepares an average of eight shots, the total number of charges prepared in a single day would be $8 \times 50{,}000 = 400{,}000$; or in a single year of 260 working days there would be a grand total of $260 \times 400{,}000 = 104{,}000{,}000$ charges prepared for blasting.

But, it is estimated that out of the 550 fatal accidents occurring yearly in our anthracite mines, 14 per cent. of these are due to the use and handling of explosives. This makes the total number of fatal accidents due to explosives $0.14 \times 550 = 77$ lives. It is thus perceived that the number of charges fired, per life lost, is $104{,}000{,}000 \div 77 = 1{,}350{,}650$ charges, nearly.

It is true, as has been stated before in *Coal Age*, that it is not the inexperienced but the experienced miner who is the most frequently hurt. The experienced miner has, through long years of practice, grown careless in the handling of explosives. The more often one performs a dangerous task and the more he handles explosives, the more careless he becomes. Not long ago I overheard the remark of an artillery instructor who said that he could always depend more on a green recruit than on an old soldier, in the handling of explosives or moving them from one place to another.

COMMON CAUSES OF MINE ACCIDENTS

Allow me, to give the following common causes of accidents that occur in the use and handling of explosives:

1. A miner bites off the end of a squib, or dips the match in oil, or cuts too short a length of fuse to quicken the explosion of the charge that he has prepared, and the shot goes off before the miner reaches a place of safety.
2. A miner returns to his place too quickly, on the failure of a shot to explode in the usual time, and is caught and killed by the delayed blast, which was a hangfire.
3. A miner attempts to withdraw a charge that has failed to explode and an explosion follows and kills him.
4. A miner prepares a charge, with his lamp in his cap on his head, and the result is that a spark falls from the lamp into his powder can and the fellow is badly burned or killed.
5. Carrying explosives unprotected on one's person or leaving it in niches in the rib or on the timbers supporting the roof.
6. Tamping a shot with a steel or iron bar.
7. Crimping a detonating cap with the teeth, instead of using pliers designed for that purpose.
8. Not properly adjusting the cap or detonator in a cartridge.
9. Using an inferior quality of explosive or mixing different explosives in the same charge.
10. Attempting to thaw explosives when frozen.

The right and wrong methods of inserting a cap in a primer were explained in the discussion "Priming a Cartridge," *Coal Age*, Vol. 14, p. 327 and I will not repeat the operation here. In spite of the state mine law prohibiting many dangerous practices in the use and handling of explosives, miners still persist in taking chances and violating the law. An instance of this was the fatal accident that occurred in the Baltimore No. 2 tunnel of the Hudson Coal Co., at Wilkes-Barre, Penn., a few days ago (June 5), in which nearly a hundred men lost their lives.

It is reported that about 150 men were being hauled into the mine on a special trip of cars and, in violation of what should be the law in every mining state in the Union, the men took seven kegs of powder into the cars with them. The explosion that took place, whether caused by the breaking of the trolley wire or a miner's lamp or otherwise, filled the entry with flame, burning and killing the men.

OBEY THE LAWS AND AVOID MANY ACCIDENTS

To avoid these fatal accidents, the miners must cease to violate the laws made for their protection. Many miners seem to think that these laws are made in the interests of their employers and they are often indifferent to them. It is up to the mine officials and mine inspectors to teach them that this is not the case. Every violation of the law whether resulting fatally or otherwise should be suitably punished. There is no industry where care and constant vigilance is more needed than in coal mining.

Seldom does a miner feel his own responsibility for the safety of himself and his fellow-workers. If the fireboss reports his place safe in the morning when he goes to work, the miner takes it for granted that it is safe throughout the day and gives little heed to any danger that may develop. Every practical miner should know that the condition of his place, in respect to safety, may be greatly changed after the first shot is fired, and care is needed to avoid danger.

Before closing, kindly allow me to give the following brief don'ts, which every miner should keep in mind:

1. Don't go to a powder house with a naked light or a lighted pipe or cigarette.
2. Don't carry powder on your shoulder when stepping on the cage to go down the shaft or when traveling an entry where trolley wires are hung.
3. Don't ride in cars carrying explosives.
4. Don't carry explosives about your person or send a laborer to bring them but go yourself.
5. Don't open your box to start to make up a charge of powder until you have first placed your lamp at a safe distance away from the box in the direction in which the air is passing, and don't smoke a pipe or cigarette when preparing a charge or handling an explosive.
6. Don't shorten the match of a squib, or dip it in oil, or cut too short a length of fuse in blasting.
7. Don't crimp a cap with your teeth, in order to make it fast on the fuse, but use the pliers for that purpose.
8. Don't tamp a hole with a steel or an iron bar, but use a wooden tamping rod, which can be gotten at the powder house.
9. Don't fail to keep your box in a safe place away from the track and don't sit on the box with your lamp when smoking.
10. Don't return to a shot that has failed to explode, or proceed to examine a blast until the smoke has cleared away after the explosion, and don't use two kinds of powder in the same hole, or attempt to withdraw a misfire.

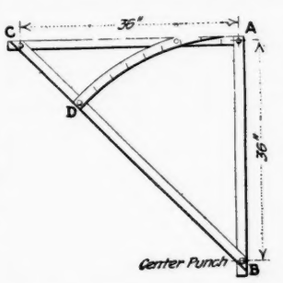
These and many other don'ts that might be mentioned, if obeyed, will save many lives.

West Pittston, Penn. RICHARD BOWEN.

Turning Rooms Without Sights

Letter No. 3—I have been interested in the several references and suggestions made recently, in regard to turning an angle where no instrument is available, as when a room is to be turned off an entry and there is no sight given to determine its direction. One suggestion is that given by Ostel Bullock, *Coal Age*, Feb. 13, p. 306, which was followed by another, by a gas inspector of Worley, Ky., in the issue, Apr. 24, p. 742.

Kindly allow me to describe a triangle that I have found useful for this purpose and which can be readily made by almost any handy mine blacksmith, with a little assistance from an engineer. The scheme is shown in the accompanying diagram and consists of a right triangle made of bar or strap iron. As shown in the figure, there is riveted to this triangle the arc of a circle graduated every 5 deg. from 0 to 45 degrees.



The device is readily constructed by taking a flat, iron bar $\frac{3}{8}$ by $1\frac{1}{2}$ in., in section, and 6 ft. 4 in. long, cutting it in the center and welding the two ends together to form a right angle, and drawing out the corner until it is a perfect square as shown at *A*. To complete the triangle the cross-brace *BC* is riveted at *C* and secured at *B* by a $\frac{3}{8}$ x 1-in. capscrew, with a center punch made in the head to form a sight.

An engineer should then mark off the arc of a circle, on a radius of 36 in. A few nails set firmly in a board will enable the blacksmith to bend a piece of strap iron sufficiently close to the arc to serve the purpose intended. The arc is then riveted to the triangle, as shown in the figure, and when this has been done a notch is filed in the end of the arc $\frac{3}{4}$ in. from the side of the triangle, so as to correspond to the sight point at *B*. Similar notches are filed in the arc for each five degrees, but this should be done by the engineer, who divides the arc, from *A* to *D*, into nine equal spaces of five degrees each.

The use of this device will need no further explanation than to say the side *BA* is first made to conform with the center line of the entry, and the side *AC* will then indicate the direction of a room driven at right angles to the entry. The graduated arc can be used to deflect any desired angle. IVOR LIVINGSTONE.

Paint Cliff, Ky.

Perils in Reconstruction

Letter No. 9—Reading the several letters that have been written, regarding the work of reconstruction following the war, impresses one with the thought that there is a general feeling of worriment prevailing at the present time and that practical men are devoting much thought and time to the study of the situation.

As everyone knows well, we were not expecting peace any more than we were looking for war at the time it was forced upon us through the encroachments made upon our rights as a nation. During the critical period that followed, it was our patriotism and determination to win that led us to sacrifice everything.

When one considers the spirit of sacrifice and cooperation that was manifest by the people throughout the country at that time, there is a feeling that the same patriotic spirit will continue to triumph over the difficulties presented in the problems that confront us in getting back to normal conditions.

FAIR AND JUST TREATMENT OF LABOR

Of all the problems that have arisen probably the most important is the readjustment of wages in the industrial world. It is natural to feel that some trouble may arise from this source, but the solution is to be found in the honest and fair dealing on the part of both employer and employed.

The war has given a great impetus to the labor movement. The higher wages that have, for a time, been within their reach has given to the large majority of laboring men a desire for better living conditions. This desire that has taken possession of so large a proportion of industrial workers is one that employers must consider. These, indeed, have a new lesson to learn in regard to the treatment of the men they employ.

If perils in reconstruction are to be avoided, labor and capital must each develop a spirit of patriotism and coöperation. A fair day's work must be given for a fair wage that will provide good living conditions for all. Much will depend on mine officials avoiding the treatment of their men as inferiors and slaves, using rough language and discharging them for small offenses.

No one will deny the right of a foreman to discharge a man when such action is necessary to maintain the discipline of the mine. But, when a man is discharged for a trivial offense, it has a tendency to create a feeling of unrest among his fellow workers. It is this restlessness that makes the workers easy marks for the I. W. W. or agitators for Bolshevism.

At present, one thing that creates a feeling of uncertainty in regard to the future is the common belief that

wages will be lowered. The situation is one in which little material is being purchased owing to the fear that prices will come down in a short time. Needed repairs are being held up for the same reason.

When the question of wages and prices of material is definitely settled, all business will reach a more normal basis. What would greatly assist in restoring confidence would be the opening up, by the government, of the long-planned building projects which would give ample employment for our returning soldiers.

———, Ky. PATRIOT.

Quality of Mine Timber

Letter No. 2—Some time ago, I read with much interest a letter that appeared in *Coal Age*, drawing attention to the need of using a good quality of mine timber (Feb. 13, p. 333). This is a subject that mine superintendents and foremen should consider worthy of more attention than it has commonly received at their hands. In this respect, not only the quality of the timber but its size and kind should be regarded.

Too often it happens that a mine is located in a section where timber is plentiful and little thought is given to its proper use until the supply is nearly exhausted. Then the higher officials generally awake to the fact that the company's timber has been wasted and the foreman is quite generally blamed for its misuse.

Where a poor quality of wood is used for timbering mine airways, it will last but a short time and the expense of renewal cuts a big figure in the cost-sheet of the mine. It often happens that this gives rise to bad feeling between the management and the superintendent, foreman or purchasing agent who is responsible for the quality of the timber sent into the mine.

CARE NEEDED IN THE PURCHASE OF TIMBER

In order that a mine shall be safely and efficiently timbered, not only must good timbermen be employed, but the one who does the buying must be a practical man fully acquainted with mining conditions and familiar with the qualities of timber. Moreover, he must be furnished with data in respect to the size of the timbers required for different purposes. Contracting for mine timber must include full specifications giving the size, kind and the time of cutting the wood, which should always be done in the winter months when the sap has left the timber and the latter is more readily seasoned for use.

An incident that illustrates the waste of timber that may result from lack of care in the specification of what is needed in the mine, occurred at a place where I was employed not many years ago. It became necessary to timber a particularly weak portion of the haulage road in that mine, and the foreman gave an order for sawed timber to be used for the collar bars. By some mischance the bars when delivered were found to be too short and had to be thrown aside. As the superintendent refused to place another order for sawed timber, it became necessary to cut such timber as could be found on the company's land, which, however, furnished nothing of a suitable quality for mine use.

After many delays and misunderstandings, I received 20 sets of timbers, and was told to place them 4 ft. apart, center to center, which I did. Hardly had I finished placing these 20 sets when it was necessary to start putting in other timbers between them, because it was clear that the timbers already set would not support the roof. There was poplar, beech, elm, birch, and some hickory. Some of it was fairly good, but, owing to the way in which it had been cut, it could not be used efficiently, and the whole job was a failure. Had the timbers been able to support the weight, however, much of it would soon have been covered with fungus growth, in the mine, and would have rotted in a short time.

It is gratifying to know that many of the larger companies operating in this state are now giving the timber question considerable thought. Some of these companies have started to replenish their diminishing timber supplies by setting out new trees. In one or two instances, several hundred acres of land have thus been retimbered in a year. One company has several hundred acres of walnut trees that will be large enough for use as mine props, in a very short time. While the company could sell this timber they realize that the quality of the timber is more important than the profits of its sale.

OBSERVATIONS ON WET AND DRY CONDITIONS

My own observation leads me to believe that white-oak timber when cut in the winter months will outlast any hardwood timber if it is used either in a dry place or in a wet place, alone. But if it is subjected alternately to wet and dry conditions it will rot quicker than some other timbers under the same treatment. Elm, I believe, will last longer when it is wet part of the time and then dried, or where the air is moist part of the year and then much drier.

Frequently, much of the annoyance of broken timbers can be avoided by the mine foreman using good judgment in placing timbers of different kinds in parts of the mine where they are best adapted to the conditions. Also, when drawing timbers from worked out areas, much of the broken timber can be used again, for lagging or for short legs set in hitches cut in the coal, and still smaller pieces can be split up for caps.

In drawing pillars in mines, it is necessary to have props of good quality that are able to perform the duty required of them. When soft props are used for this kind of work, they should be tapered somewhat at the bottom so that they will mushroom at the point, instead of being broken by the descending weight. This will permit of their being used again. A proper regard for these precautions will make coal mining not only safer but more economical, by enabling the recovery of a larger amount of pillar coal. I hope we shall hear from others who have had experience in the use of different kinds of timber under different conditions and where the quality of timber has been made a study.

Cleaton, Ky. OSTEL BULLOCK.

Efficiency of Mine Workers

Letter No. 3—Kindly permit me to refer to the question of a six-hour day and a five-day week mentioned in the general labor review that appeared in *Coal Age* a short time since (Apr. 3, p. 629). I wish to draw a brief comparison between conditions in the mine in Great Britain and those in this country, from the standpoint of a miner.

Having worked in the mines in the North of England over 20 years before coming to this country, I should say that the work of mining coal there is far more arduous, owing to the greater depth of the seam and the decreasing height of the coal. Moreover, the mines

in Great Britain are seldom as well ventilated as the coal mines in this country, although I will not say but that the ventilation here could often be much improved.

My opinion is that the work of mining is not as healthy in British mines as here in America and, for that reason, the British miners are more justified in demanding shorter hours than are the miners in this country. I believe, however, that our miners, here, would be satisfied with something less than a 30-hr. week. Nevertheless, it is possible that the proposition would provide a suitable remedy for the present injustice done to a large proportion of mine workers, owing to the closing down of many of the smaller mines, while other mines are working practically full time and, in a few instances, are hardly able then to fill their orders for coal.

Anyone familiar with the situation will agree that coal mining is somewhat of a seasonable occupation, and this is true to a greater extent in this country than in Great Britain. Considered from this angle, the question of a 30-hr. week has another significance quite different from what would apply to the mines in Great Britain. It is unnecessary to argue that equal fairness and justice should be shared by all coal miners in this country. To secure this equality of conditions, the lesser demand for coal in the summer season should be met by a reduction of the number of working hours, rather than by the closing down of those mines that may be less fortunate in the matter of securing orders for their output. The arrangements necessary to effect this distribution of work and accord to every mining district equal fairness and justice may require some provision that would rightly regulate the industry.

The Allotment Law in England

In England, there prevails what is known as the "allotment law." By this law, the town council or the county council, on the receipt of a petition asking for the allotment of certain lands and signed by a sufficient number of voters in the district, grants the said allotment at a certain reasonable rate of compensation or rent, which they are authorized to fix. I believe the scheme has been found fairly satisfactory both to those desiring the allotment and also to the farmers and land owners concerned.

This is only a suggestion of what is done to relieve the distress that may arise in certain districts, during the summer months. The arrangement is far better than compelling operators to pay their miners for a full week when they work but half-time, which would be an injustice to operators. I do not wish to be misunderstood, however, and will say if our miners are to be granted a 30-hr. week during the summer months, let them be paid for the 30 hours of work performed, which would be reasonable and just; only let the distribution of the summer demand for coal be such as to give to every mining district and mine the same opportunity for work.

During the winter, it is my opinion that a working day of 8 hours, counting from the time the miner enters the mine until he again reaches the surface, ought to be considered a reasonable day's work. To make the 30-hr. week apply to the winter as well as the summer would not enable the mines to meet the demand for winter coal, unless a larger number of miners were to be employed during that season, which would mean an overplus of labor in the summer months.

———, Ind. EQUALITY.

Prime Producer in a Coal Mine

Letter No. 2—The question of who is the prime producer in a coal mine, suggested by the inquiry that appeared in *Coal Age*, Apr. 3, p. 637, seems to me should not be restricted to the workers underground, but should be taken to include all who contribute their share in the work of production. My idea is that the coal is not actually produced until it has been placed where it can be utilized; or, in other words, put on the market.

Now, I notice that both the inquirer and the editor replying to this question regard the miner who digs the coal as the actual producer. While there is no question but that a good class of industrious, thrifty and steady miners are a great asset in a coal mine and go far toward insuring a steady production, it must be remembered that when the coal is loaded into the mine cars, or even after it has reached the tipple and is dumped over the screens, it has not been placed where it can be used by the consumer.

The Individual Workers in an Organization Likened to the Spokes in a Wheel

In answering this question, the editor has very properly likened the entire force, engaged in the operation of producing coal, to a wheel having many spokes. He states that one spoke may be missing and the wheel will still perform service. The illustration is an apt one and sets me to thinking as to which of all the workers concerned in producing coal on the market is of the most importance.

Now regarding the question from this point of view, it appears to me that there can be no production, unless the mine is operated continuously; and I want to ask, Who of all the mine workers is the one most largely responsible for keeping things moving in the mine? My answer is, The mine boss or foreman. It is my belief that he is the most important spoke in the wheel.

Not only does the mine foreman perform his own particular duties, in the direction of the work; but it is up to him to determine the relative efficiency of each worker in the mine and, by correlating their work, strengthen every spoke in the wheel. Where he discovers one that is weak he studies how to improve and strengthen the defect, or to replace the weak spoke by a stronger one. Should the foreman become inactive, or allow these defects to escape his attention, the development of the mine and its production will certainly suffer.

The importance of a good foreman is readily observed when one goes into a mine and finds the miners idle for lack of cars to load. There may be some trouble on the haulage road, or in the shaft, which delays the turn that should come regularly to each miner. Everything must stand still until the foreman or one of his assistants finds and removes the trouble and again puts the wheel in motion.

A wise management can easily determine the condition of affairs underground, by a close scrutiny of the development shown on the blueprints of the mine map, and by the amount paid for yardage each month. Under normal conditions of working, this amount should be in proportion to the tonnage produced. For this regular development, which is the index of production, I hold that the mine foreman is most largely responsible and is therefore the "prime producer."

Linton, Ind. W. H. LUXTON.

INQUIRIES OF GENERAL INTEREST

ANSWERED BY JAMES T. BEARD

Outlook in Coal Mining

The fact that many helpful suggestions have appeared in *Coal Age*, from time to time, in the discussion of numerous difficult problems that arise in the operation of coal mines leads me to draw attention to a situation into which it would appear the coal-mining industry is helplessly drifting today, and to ask if there is anything that can be done to avoid the disaster that threatens many mines.

It is well known that, for the past three and four years the extraordinary demand for coal, by reason of the war, has resulted in the opening of a large number of mines throughout the country, many of which are in isolated positions in respect to the transportation of their products to market. Again, in the haste to produce a large output of coal, other mines more favorably located are by no means equipped in a manner to compete with longer established operations in their district and supplying the same market.

The question is, What can be done to insure the future of mines that are thus handicapped at the present time? Now that the war is over, there is not the same demand for coal that there was and which was responsible for bringing to life these new operations. It is not strange, representing as they do capital invested largely in a patriotic spirit at the time of the nation's need, that much uneasiness will continue to prevail, unless a way out of their difficulties can be found that will insure to them a future based on an increase in the industrial life of the country? It would seem that there would be a constantly increasing demand for the exportation of coal from this country owing to the devastation in Europe and the needed work of reconstruction, which is now already under way.

Allow me to ask *Coal Age* and its practical readers who are so largely interested in the welfare of the coal-mining industry, what suggestions they have to offer that will render the present outlook more hopeful. What measures can be adopted generally, in the coal industry of this country, that will afford an intelligent solution to the situation that confronts a large number of our mines?

Observation convinces me that this situation is not exceptional, as affecting but a few isolated operations, but there are a large number of producing mines that have not become sufficiently established in the markets and who are otherwise handicapped by reason of their limited experience in the undertaking in which they embarked at a time when the nation needed their help. Now, that times have changed, these young operations need what support and assistance can be given them by government regulations and the intelligent advice of coal operators longer in the game. OPERATOR.

————————, Ill.

Coal Age is glad to submit this inquiry to the helpful consideration of its readers. The letter is but a sample of others that betray the uneasiness that naturally exists in the minds of a number of coal operators owing to the indefiniteness respecting the future of the coal industry.

It is true that all industries are experiencing a crisis at present. How long this crisis must be endured and what the future has in prospect is necessarily quite uncertain, but there is more reason to be hopeful than to be castdown regarding the outlook. There is every reason to anticipate a great revival of business throughout the industrial world, and coal mining is the chief dependency of that industrial life. These are words of cheer, but none the less true.

The present problem, however, is to bridge the chasm of readjustment that divides the abnormal conditions of the war period and the normal conditions to follow when the wheels of industry are again set in motion, and labor and capital are working in harmonious and satisfied coöperation. In the meantime, let our help be extended to preserve the life of every operation, however simple, believing there will soon be need and a ready market for all production.

Without prejudicing the many good suggestions that will undoubtedly come from our practical readers, in response to this appeal, we would suggest that there is great need at this time that every operation should look well to the efficiency of its organization. Particularly is this true in respect to new undertakings. There is far more to be learned, in regard to the efficient and successful operation of a coal mine than many operators of long and varied experience are willing to believe.

The result of recent investigations of power-plant efficiency, in large corporations, has proved that the stopping of unsuspected leaks in all industries can only be intelligently accomplished by those who have an intimate acquaintance with the science and practice involved in an operation and which must go hand in hand in order to secure the highest efficiency. This fact has been demonstrated in the industrial life and success of many large coal corporations.

The present low rate of production in the bituminous mines of the country, and the fact that consumers are getting rid of the reserve stocks accumulated during the war period, presages a scarcity of fuel this winter that will be every bit as serious as that experienced last year. This will be particularly so if the winter is severe.

Under these circumstances, it is a foregone conclusion that the output of every operating mine will be needed if industry resumes the activity it manifested before the signing of the armistice. The demand for coal will then tax the operating facilities of the mines to the uttermost, and the small operations that proved of such utility in the time of need will again justify their reason for existence. Only those plants, however, that have kept equipment and apparatus in first-class working condition will be in position to reap the harvest.

EXAMINATION QUESTIONS

ANSWERED BY JAMES T. BEARD

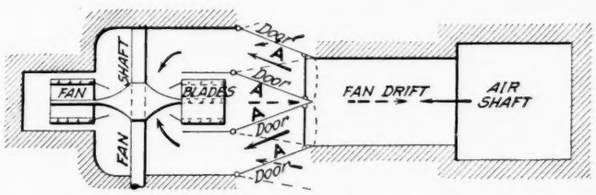
British Columbia Examination First Class, Nov. 20, 1918

(Selected Questions)

Ques.—(a) Explain the difference between a force fan and an exhaust fan. (b) In case of a fire, if it becomes necessary to change an exhaust fan into a force fan, how would you do so? Give an intelligent sketch showing the arrangement necessary to effect the change required.

Ans.—(a) As far as the fan is concerned, the action is the same whether it is exhansting or forcing the air. Air is drawn into the central opening and thrown out toward the circumference of the fan where it is discharged. The difference between these two types of fans consists solely in their connection with the mine. When the fan is forcing or blowing air into the mine, the intake orifice is open to the atmosphere and the discharge is connected with the fan drift leading to the mine. On the other hand, if the fan is exhausting, the intake opening is connected with the fan drift and the air drawn from the mine is discharged into an expanding chimney that opens into the atmosphere.

(b) Referring to the accompanying figure, which is the plan of a fan arranged to exhaust air from a mine,



PLAN OF A REVERSIBLE CENTRIFUGAL FAN

in order to alter this fan to a blower, it is necessary to swing the four doors marked *A* to the positions indicated by the dotted lines. At the same time, it is necessary to cut off the discharge into the chimney and direct the air into the fan drift by swinging another door upward, which is not shown in the plan.

Ques.—Does a change in the barometer affect the volume of air passing through a mine? If 20,000 cu.ft. was passing, with a barometer of 30.5 in., what would be the result if the barometer dropped to 27 in.?

Ans.—A change in barometric pressure produces no appreciable effect in the volume of air passing through a mine ventilated by a centrifugal fan. A fall of barometer from 30.5 in. to 27 in. causes a corresponding decrease in the density of the air, which very slightly affects the efficiency of the ventilator but not to an extent to be appreciable. It has sometimes been assumed that an increase or decrease in the density of the air affects the friction of the air flowing through the mine, but the difference, if any, cannot be measured in the quantity of air passing.

Ques.—State what precautions you would use to prevent accidents and fires arising from defective installation of electricity in the mines, for power purposes.

Ans.—All installations of electricity for power purposes in mines should be in the charge of a competent electrician who is thoroughly familiar with mining conditions. As far as the mine officials are concerned, after the installation has been properly made and approved, every precaution must be taken to see that all rules and regulations are strictly obeyed. Any violations of the rules or tampering with electric wires or electrical installations should be suitably punished. Extra precautions must be used to prevent accidents from falling roof on entries and in passageways where power lines are installed. To avoid accidents from any defect in the installation, all power lines should be periodically and carefully inspected by an electrician, as he is the only one who can detect where an installation is defective.

Ques.—Describe what you consider a really efficient practical and economical system of watering dry and dusty mines.

Ans.—A watering system to be thoroughly effective, in a dry and dusty mine, should be installed by carrying a pipe line through the several airways and, particularly, on the haulage roads. The pipe should be arranged with perforations at suitable intervals, so as to furnish a good spray of water at these points, sufficient to keep the roads and entries in fair condition. It must be remembered, however, that no spraying system of this kind is wholly reliable as a preventive against the dangers of dust, and it is necessary, therefore, to clean all roadways regularly and thoroughly, so as to remove what dust is practicable from the roads and timbers. Branch pipe lines should be conducted to the face of each room or chamber, for the purpose of watering the working faces and the roads in the rooms. Sprinkling at the working face is more important even than the spraying of the haulage roads.

Ques.—Find the size of single pump required to pump 250 imperial gallons per minute from a depth of 500 ft. Effective steam pressure 60 lb. and piston speed 80 ft. per minute.

Ans.— Since the imperial gallon is 277.274 cu.in., 250 imperial gallons is $250 \times 277.274 = 69{,}318.5$ cu.in. Then, assuming the efficiency of the water-end of the pump as 80 per cent., the required plunger displacement is $69{,}318.5 \div 0.80 = 86.648$ cu.in. Then, the piston speed of the pump being 80 ft. per min., the sectional area of the plunger is $86{,}648 \div (12 \times 80) = 90.26$ sq.in. The diameter of the plunger is, therefore, $\sqrt{90.26 \div 0.7854} =$ say $10\frac{3}{4}$ in. But, making due allowance for slippage, we assume a 12-in. plunger. For a head of 500 ft. and allowing 20 ft. additional for friction head, the pressure on the water-end is $520 \times 0.434 = 225$ lb. per sq.in. An available steam pressure of 60 lb. per sq.in. will require a steam cylinder of $225 \div 60 =$ say 4 times the area or twice the diameter of the plunger.

FOREIGN MARKETS AND EXPORT NEWS

EDITED BY ALEX MOSS

Coal-Mining Situation in France and Belgium

The problem of supplying coal and coke for France and Italy is the most serious economic question of the day, states George S. Rice, in a report made to Van H. Manning, director of the U. S. Bureau of Mines. Mr. Rice is abroad as a member of a commission sent to observe reconstruction conditions and methods in foreign countries.

Before the war France consumed annually about 62,000,000 metric tons of coal. Production, on the other hand, amounted only to 41,000,000 metric tons, which meant that France imported annually about 21,000,000 metric tons of fuel in order to round out her requirements.

The principal coal basin of France is the Nord-Pas de Calais. Three-fourths of this area was occupied by the Germans in 1914 and nearly the whole of the rest of the basin was brought under artillery fire. The coal production was reduced to about 8,000,000 tons, normal production being nearly 30,000,000 tons. It will take from two to five years to increase this amount materially, and perhaps ten years to get back to the normal prewar production.

Belgium before the war consumed 27,000,000 metric tons of coal per year, while the output from her mines amounted to 23,000,000 metric tons annually. Belgium both imported and exported fuel in the prewar period, her imports totalling 9,000,000 metric tons and her exports 5,000,000 metric tons.

The coal mines of Belgium were not destroyed by the Germans, as the latter intended to retain possession of the country. The production has dropped from 23,000,000 metric tons in 1913 to 14,000,000 in 1918, which is a reduction of 40 per cent. The number of workers has been reduced from 145,000 in 1913 to 110,000 in 1918, or a reduction of 24 per cent. The coal mines of Belgium are expensive to operate, and the industry has been greatly disorganized by German occupation. The Belgium coal production will be slow in reviving.

Annual deficits are to be faced in France and Belgium for several years, as can be seen from the following tabulation:

	Metric Tons
Destruction of French output	20,000,000
Reduction of Belgium output	9,000,000
Normal French import over export	21,000,000
Normal Belgium import over export	4,000,000
	54,000,000
Normal output Saar Valley	16,500,000
Now reduced by labor troubles to	12,000,000
Total shortage (considering supply from Saar Valley)	42,000,000

The destruction of metallurgical plants in Belgium and France will lessen the immediate need for fuel by about 12,000,000 metric tons. Pending the rebuilding of plants and the rebuilding of the industry during the next five years or more, there will be a total deficit of about 30,000,000 metric tons of coal per year in France and Belgium.

Great Britain exported before the war 15,000,000 metric tons of coal to France and Belgium, and 9,000,000 metric tons to Germany, making a total of 24,000,000 metric tons exported. Coal production in England has been reduced on account of a shortage of labor.

The Saar Basin politically has three divisions with normal outputs as follows:

	Metric Tons
Prussia	12,000,000
Bavaria	1,500,000
Lorraine Annex	3,000,000

Lorraine Annex will be returned to France. There are some possibilities of further extensions in this part of the Basin. The Bavarian portion is a small corner without much possibility of further development. The Prussian area is the property of the state, thus making it easier to shift ownership or control to France. At the present time all the mines of the Saar Valley are supervised by the French military authorities. Wages have doubled and trebled since the war began.

In the foregoing consideration, Luxemburg has not been counted nor have the needs of Lorraine Annex. Westphalia should be called on to supply these districts and also Holland, which country normally imports 2,000,000 metric tons from Great Britain and over 7,000,000 metric tons from Germany.

English Coal Markets

The outstanding feature of the week's principal coal markets, says the *Iron and Coal Trades Review* of May 9, has been a continual scarcity of fuel supplies. Prices remain fixed for home consumers, but the cost of export coal advances.

In the Tyneside markets the coal situation shows little alteration, though a number of collieries report things as more satisfactory. The inquiry for fuel is heavy from most quarters, and the area of demand is extending.

Throughout Yorkshire and the Midlands, with production better maintained, supplies generally are easier. There is a strong belief that the ban on exports from these districts will be lifted shortly. There is practically little fuel offering in the open market, and prices remain unaffected.

In the South Wales area pressure for all classes of coal continues; and with supplies so limited and Allies receiving preference, it is next to impossible to secure any quantities for export to neutrals.

Conditions in the Scottish coal markets are moving along from day to day without much variation. Outputs are being disposed of without much difficulty, as the demands for home purposes are still fairly good. Surplus tonnages not required for local consumers is readily taken up for export.

Slow in Getting Coal Export Program Under Way

Considerable dissatisfaction is in evidence as to the progress made in getting the export coal trade under way. The methods thus far devised are not regarded as promising. There is complaint arising from the rates which the Shipping Board will charge. It is feared that American exporters will be unable to compete with the English rates, which are said to be much lower.

There is no question, however, that considerable business is to be done with northern Europe and Mediterranean ports. There is little hope, however, of establishing permanent markets. By taking advantage of the present situation and rushing coal to those markets in the largest possible quantities, it is believed that very respectable profits can be made in the near future. This business is being handled with the same idea as had distant dealers in building materials when they rushed large stocks into Baltimore and into San Francisco after the disasters in those two cities. They made large profits for the time being, but had no hope of holding the business permanently. In addition to the financial profit, there will be the important benefit of the experience.

So far as a permanent export market for coal is concerned, the really fertile field is limited to Latin America and to Canada. All are agreed that it is an economic necessity for the country to do an export coal business, but confronted by the Shipping Board's high rates and a decided timidity on the part of the Government to assist, the way that it is going to be accomplished is not clear. Some are of the opinion that coal men at least "cannot hunt business in gangs." When attention is called to the fact that Germany was very successful "in hunting business in gangs," the answer given is that Germany had a government which was not afraid to offend other governments. Nevertheless, there is intense effort being put forth in Washington to reduce the formidableness of the obstacles which confront coal exportation, and it is practically certain that a workable plan will be hit upon finally.

Possibilities for Swedish Coal Imports from America

Sweden is almost entirely dependent on England for its coal supply. Lately coal has been coming into Sweden in quantities approximately but one-third of normal which, of course, is seriously affecting Swedish industry, primarily the iron and steel industry, reports Trade Commissioner Norman L. Anderson, Stockholm. This serious coal shortage has brought forth a great deal of comment relative to the possibilities of obtaining coal from America. Mr. Anderson has been approached by a number of Swedish business men who desire to import coal from the United States, the chief obstacle being, of course, the tonnage situation. Below is given a translation of an article bearing on the subject, which appeared in *Svensk Handelstidning* for Mar. 16, 1919:

Otto Wallenius, a wholesale dealer in Goteborg, has made some rather pessimistic statements concerning the possibilities of importing American coals to Sweden. He points out that an offer, made a month ago, for importation of considerable quantities of coal has been dropped, partly because the price offered, 103.50 crowns ($27.7 per ton is considered too low with the present high freights, especially inasmuch as return cargoes are lacking.

Mr. Fürst, chief of the Swedish Handelskommission (Trade Commission), on the contrary, has pointed out to *Svensk Handelstidning* that the import of American coals does not seem to be impossible. The Handelskommission as well as some private importers are for the present negotiating about it.

According to information the import as regards the Handelskommission would comprise 50,000 tons. As matters stand at present it is, however, very difficult to express any opinion as to the quantity that may be obtained. The whole question depends on the freighting possibilities. The prospects of getting Swedish tonnage are very small, partly because there has lately been a great lack of tonnage, not least because the vessels have been detained for months in English coal ports, and partly because of lack of return cargoes to America. The Handelskommission counts exclusively on American tonnage, of which there seems to be an ample supply. It is not considered impossible, either, to arrange home freight for American vessels from England or perhaps other countries.

Before the war only a small quantity of American coal was imported to Sweden. Therefore it may now be difficult to sell American coal to Swedish coal consumers. Before deciding on any larger coal importation from America, Mr. Fürst further pointed out that it is necessary to ascertain whether there will be a large Swedish market for American coal. If this proves so, which Mr. Fürst for his part does not doubt, one need not give up all hope of importation, especially as there is every reason to expect that the tonnage problem will not be so difficult to solve after the war, as was first feared. Besides, coal import from America has already begun. As is known, the Swedish state railroads have bought 30,000 tons, the first cargoes of which are expected to arrive in Swedish port by the end of this month.

In a conversation that *Svensk Handelstidning* has had with coal import firms in Stockholm, it is pointed out that American coal suppliers have offered coal to several Swedish importers at a price varying between 105, 115 and 117 crowns per ton, and even more, c. i. f. Goteborg. The Stockholm importers, however, do not wish any reloading in Goteborg, as that would make the coal still dearer. Besides, they can hardly bear any reloading and therefore the importers wish the coal delivered directly to Stockholm.

COAL AND COKE NEWS

What Happened in May

[The bracketed figures in the text refer to the number and the page of the volume in which references to the matter noted may be found and should the reader desire further information he can obtain it in the place indicated.]

May 2—The United States Circuit Court of Appeals hands down a conditional affirmation of the judgment rendered by the District Court in the case of the Coronado County Mining Co., of Sebastian County, Ark. vs. the United Mine Workers of America [XV, 873]—The large breaker of the Delaware & Hudson Co., at Jermyn, is closed for an indefinite period. Coal from the Jermyn mines will be sent to the Powderly breaker [XV, 929]—Charles D. Neill hands down a decision under which 200 contract miners of the Lehigh & Wilkes-Barre Coal Co. will receive back pay for work done since 1917. The point at issue was payment for the removal of rock in the robbing of pillars. [XV, 916].

May 3—A disastrous accident occurs at the mine of Old Ben Coal Corporation, at Buckner, Ill. As several men are being hoisted out of the mine on a cage, one is killed and three others are injured. [XV, 930]—As the result of a mine fire on No. 12 east gangway, Nottingham Mine, of the Lehigh & Wilkes-Barre Coal Co., 50 men nearly lose their lives. They are brought to the surface in a serious condition, being overcome by blackdamp [XV, 885]—The Victory Loan drive ends at 12 o'clock, midnight—The coal-export committee of the American Mining Congress meets at a luncheon in the rooms of the Machinery Club, 50 Church St., New York City. The meeting votes to appoint a committee to prepare a report and recommendation for coöperative effort to be submitted to a general conference [XV, 867]—The Western Coal Operators' Association of Canada meets and discusses the position of the coal industry in regard to the labor question [XV, 1093].

May 5—Charles P. Neill rules that contract miners who are taken off their regular work for an emergency job shall be paid the rate called for in their scale if the pay for the other job is less [XV, 916]—A cage containing ten miners drops 1100 ft. at the Maple Hill shaft of the Philadelphia & Reading Coal and Iron Co., resulting in the death of one miner and the serious injury of the nine other men, two of whom may die [XV, 885].

May 7—A new workmen's compensation bill is introduced at the Pennsylvania legislature by Senator Smith [XV, 929]—The peace treaty and the constitution of the league of nations (one document) framed by the peace conference at Paris, is handed to the German plenipotentiaries—The Mt. Jessup Coal Co.'s employees, to the number of 400, go on strike, leaving only the company men at work. The men claim that their wages are being reduced [XV, 916]—The Racket Brook Coal Co.'s 300 employees declare a strike because the company refuses to reinstate a motorman and brakeman who had been discharged [XV, 916].

May 8—An open market for steel products is created when representatives of the Railroad Administration and members of the general committee of the American Iron and Steel Institute fail to agree on minimum stabilization prices—Charles P. Neill rules that mine workers cannot be expected to be reinstated in their jobs if the operators can show that they were discharged for incompetency, in dismissing the complaint of H. C. Singley against the Evans Colliery Co., of Beaver Meadow, Penn.

May 9—The resignation of the Industrial Board, George N. Peek, chairman, is accepted by Secretary Redfield. Upon retiring the board releases all industries from its findings—State mine inspector Frank Rossbottom, of Illinois, announces that the conference between miners' representatives, operators and school authorities to be held in Duquoin, Ill., today, is postponed until June 6. Vocational training is to be discussed [XV, 929].

May 10—Attorney General A. Mitchell Palmer makes public an opinion to the effect that the Redfield plan for stabilizing prices in industry violates the anti-trust laws; he declares price fixing illegal. Any modification of statutes upholding a non-competitive policy must come from Congress.

May 15—All rules, regulations or orders issued by the U. S. Fuel Administrator, H. A. Garfield, relative to oil and gas, are set aside. The annual meeting of the Central Pennsylvania Coal Producers' Association is held at Altoona, Penn. Addresses are made and officers elected [XV, 1017].

May 16—The Northeast Kentucky Coal Association holds a special meeting at Ashland, Ky. Income tax statements and freight rates are discussed [XXV, 1018]—The Central Pennsylvania Coal Producers' Association holds its annual meeting at Altoona. Officers are elected [XV, 1017]—A special meeting of the operators of northeast Kentucky is held at Ashland, Ky. [XV, 1018].

May 20—Compensation amendments proposed by the Pennsylvania state administration bill are given a hearing before the Senate judiciary general committee at Harrisburg, Penn. [XV, 1016]—Amendments to the Mangan bill are proposed in the Pennsylvania Senate judiciary general committee [XV, 1916]—Congress opens at Washington, D. C., and President Wilson's message is read to the two houses.

May 22-24—The National Coal Association holds its annual meeting at Chicago in the Congress Hotel. The convention elects officers for the ensuing year [XV, 1000].

May 26—The Caldwell Bill, proposing a loan of the Government's surplus machine tools to various technical institutions in the U. S., is introduced in the U. S. House of Representatives [XV, 1090].

May 27—Men at one of the mines of the New River Co., in Raleigh Co., W. Va., return to work. Miners at another nearby mine of this company remain on strike—a question of electrification of an incline [XV, 1052].

May 27—The Ohio Valley Coal Operators' Association secures an order from the Interstate Commerce Commission directing the railroads to make marked reductions in rates on coal from western Kentucky [XV, 1063]—John P. Reese, vice president and general manager of the Chicago & Northwestern coal properties, dies at his home in St. Louis, Mo. [XV, 1065].

May 28—The administration compensation bill is reported to the Pennsylvania state Senate judiciary special committee [XV, 1063]—A committee of senators of the Pennsylvania Legislature confer with anthracite coal operators in regard to the mine cave question [XV, 1063].

May 29—It is recorded that all mine workers are out in District No. 18 (eastern British Columbia and Alberta) as a result of a disagreement about wages [XV, 1052]—The Shipping Board holds a meeting of representatives of producers, exporters and brokers at which the export situation is discussed [XV, 1060].

May 29-30—The first meeting of the Coal Mining Electricians' and Mechanics' Institute is held at Charleston, W. Va. [XV, 1076].

Harrisburg, Penn.

Efforts of representatives of employers to amend the workmen's compensation bill, in the face of the opposition of Governor Sproul and Attorney General Schaeffer, failed in the Senate on June 11. As a result the bill, which increases the scale of compensation, remains on the calender.

B. M. Clark, representing the bituminous coal interests, states that the basis on which compensation was computed in the bill as it stands amounts to more than the 60 per cent. which the bill is supposed to allow and is "Unreasonable, unjust and unfair." In some cases the compensation to be paid to beneficiaries of the bill would amount to as high as 125 and 150 per cent.

Charles F. Huber, president of the Lehigh & Wilkes-Barre Coal Co. also objected to a provision of the bill which does not deduct amounts for materials, supplies, tools and other things furnished to miners in computing wages received. He suggests that "materials, supplies and tools and other things" be included in the deduction.

The bill provides that in computing a man's wages with regard to continuous employment the wages shall be taken to be five and one-half times his average earnings at the rate for a working day fixed before an accident occurs and using, as a basis of calculation, his earnings during so much of the preceding six months as he worked for the same employer.

The amendment which it was sought by Mr. Clark to insert in the Senate bill provided that a man's average weekly earnings are to be ascertained by dividing his total earnings for so much of the preceding twelve months as he was in the employ of the employer, by the number of calendar weeks in such period; deducting, however, from such divisor and full weeks or fractional parts thereof during which he was prevented from working by reason of his own sickness, as evidenced by affidavit of attending physician.

Workmen in the mining regions of the state will be interested in an opinion given by Deputy Attorney General Hargest to state Chief of Mines Seward E. Button, to the effect that a man coming to this country with his parents, while still under twenty-one years of age, becomes a citizen without naturalization and that he is eligible for a certificate as fireboss in a mine.

Uniontown, Penn.

Official announcement has been made of the sale of all of the former holdings of J. V. Thompson, at the time of his failure the largest single holder of coal lands in the world, to the Piedmont Coal Co., a Pennsylvania corporation, for a sum approximating $18,000,000. Of this sum $5,500,000 is to be paid in cash and is for the unsecured creditors of Mr. Thompson, returning approximately 43c. on the dollar of unsecured claims. The secured indebtedness assumed by the purchasers totals between $12,000,000 and $13,000,000.

The actual identity of the Piedmont Coal Co. is withheld, but in financial circles which have been watching the negotiations there is a general impression that the company is a subsidiary or is affiliated with the United States Steel Corporation, and that the Hope Natural Gas Co. may be interested in the deal which involves the West Virginia holdings. Samuel McClay, an attorney, of Pittsburgh, is president of the Piedmont Coal Co., and William T. Irwin, of Pittsburgh, treasurer of the Union Trust Co. of that city, is also treasurer of the Piedmont Coal Company.

During the past two years the trustees have sold, under approval of the court, coal lands totaling in sales $6,500,000, bringing the total returns from the properties to around $25,000,000. The appraisement made by the receivers in 1915 estimated the value of the properties at $65,000,000. This appraisement included all of the properties turned over to the receivers, and showed the principal holdings of Mr. Thompson in 1915 to be as follows: Greene

County Holdings—Acreage 58,403.79, valued at $32,047,900.50. Washington County Holdings—Acreage 10,172.29, valued at $3,150,186.60. West Virginia Holdings—Acreage 72,103.03, valued at $18,868,841.55. Fayette County Holdings—Acreage in coal, 735, acreage in surface, 7,877.40, all valued at $2,646,500. Plant and factory sites in Allegheny, Armstrong and Beaver counties, Pennsylvania, valued at $1,557,500.

Charleston, W. Va.

Coal production in central-southern West Virginia was retarded during the first ten days of June by a car shortage confined to no one railroad system although at the end of the period mentioned the car situation had shown some improvement but was still hampering production to an appreciable extent. The continued reduction in no-market losses was more than offset by the increase in car shortage losses. The car shortage was attributed to congestion at Lake ports where the pooling of coal has been discontinued.

During the first ten days of June export shipments were increasing in volume insofar as was possible under transportation conditions existing during the period referred to, the demand being in fact insistent for coal from this particular producing section. Production from the Kanawha River south was reduced at least one-third, generally speaking, by the scarcity of cars, inadequate man power also being a factor in holding down production. The demand for coal on the Lakes was strong. Gas coal also showed considerable activity.

There would have been a much heavier tonnage out of the Kanawha district during the first ten days of the month but for lack of cars in a part of the district.

Strange to say while some parts of the field felt the need of cars others had a plentiful supply. Cabin Creek operations found it almost impossible to secure cars. The mines of the district were unable to produce more than 60 per cent. of the normal output, the general demand being such as would have justified a much larger production. Consequently some mines were limited to only about half a week's operation, although increased demand for all grades would have, under ordinary circumstances, stimulated production. The demand for Kanawha gas coal was becoming more insistant.

Up until June 10 the Chesapeake & Ohio was unable to furnish cars in sufficient quantity to meet the requirements of the mines. As is generally known, New River smokeless is in strong demand just now, not only in domestic areas but in the export trade. Much coal has been going to the Lakes as well as to New England and the supply for these markets was cut off to some extent by the shortage of cars. A scarcity of miners was also a factor in restricting the output.

The report was in circulation on June 10 in the New River field that an embargo had been placed for the time being on shipments to the Lakes owing to congested conditions. The demand for prepared sizes of smokeless is such that this particular grade is now quoted at $4. a ton, run-of-mine ranging from $2.75 to $3 and over. There is in evidence a much better demand for slack.

A 20 per cent. loss in production amounting to 71,000 tons was sustained in the Logan mining district, through car shortage alone. This was almost half of the entire production loss of 47 per cent. and the total production loss was 164,000 tons. The bulk of the remaining loss arose from no market—75,000 tons. Other sources of loss were almost negligible, but the increase in the car shortage loss which was almost double, was more than sufficient to offset the no market gain. As there were 182,000 tons produced it will be seen that but for lack of equipment mines of the district might have exceeded production for the same period of 1918 which was only 194,000 tons. The report covering May production shows 795,000 tons mined as against 1,023,000 for May of last year. May production averaged 54 per cent. of capacity which was 1,472,000, there being therefore during May a production loss of 676,000 tons. Logan coal is in much stronger demand both on the Lakes and in eastern markets. This is particularly true of gas coal.

Fairmont, W. Va.

Conditions in northern West Virginia coal producing fields during the first seven days of June were altogether different from those prevailing elsewhere in the state, at least insofar as transportation facilities were concerned. The cars furnished were ample for all requirements even though the outgoing tonnage was slightly augmented because of additional orders. Figures already compiled show that May was the best month of the year from the standpoint of production, the total shipments from the mines around Fairmont amounting to 876,000 tons. In April shipments totaled 695,000 tons.

Railroad fuel shipments were heavy throughout May, the railroads taking more than a third of the coal mined, 2123 cars went to the Lakes. It was evident during the first third of June that slight gains were being made in Lake shipments as well as to tidewater and more mines were engaged in getting out coal for export. Railroad fuel was averaging much more than a third of the total shipments. A further expansion of export shipments is looked for after July 1 when more boats will be available.

That inroads are being made on the producers of the Fairmont and other northern West Virginia regions by Ohio and Illinois operators insofar as the Lake trade is concerned is the feeling of some coal men in this section. Illinois producers as well as those in eastern Ohio have succeeded in getting a large slice of Lake business during the present year.

Birmingham, Ala.

Extensive developments in the Birmingham mining district, inaugurated by the Woodward Iron Co. two years ago, are about completed; the greater part of the new plants are ready for operation and are expected to start up during this month. The new coal mine on the company's railroad between Dolomite and Mulga is nearly completed. This is one of the large slopes of the country. The mine is equipped with every modern device, and the slope is double-tracked its entire length. Approximately 2000 men will be given employment in and around the new mines.

In addition to proving adjacent properties by drilling, three new tipples have been completed at the Dolomite openings. Each of these tipples have two dumps. With the blowing in of the third furnace at Woodward recently, it is understood that the night shifts at the mines will be resumed.

Coal fields heretofore undeveloped and without means of transportation at present will be opened up, if approximately 60 miles of navigable water are added to the Warrior River; construction of an additional dam and lock on that river may be recommended to Congress by a surveying party of United States engineers who are said to be investigating the situation. Development of the proposed project would afford an outlet for coal lands in Walker and Jefferson counties.

This investigation is authorized under an act of Congress of July 27, 1916, directing a preliminary examination and survey of Mulberry Fork of the Warrior, above Sanders Shoals. Completion of the proposed improvement, it is stated by Col. R. S. Thomas, engineer in charge, would provide 60 additional miles of navigable water to mine operators using the Black Warrior, affording outlet to coal lands noted.

Nanaimo, B. C.

A largely attended meeting was held recently at Nanaimo, B. C., to protest against the action of the lieutenant-governor in withholding his assent to the legislation passed by the Provincial Legislature in 1918 giving settlers within the Esquimalt & Nanaimo Railway belt an opportunity to claim the coal rights on their property. Addresses were delivered by Hon. Wm. Sloan, Minister of Mines; J. H. Hawthornthwaite, Member of Provincial Parliament, and Harvey Murphy, the latter being president of the Nanaimo Board of Trade. The former went fully into the history of the settlers' struggle for the coal on their property and argued that they were asking no more than justice, which should be accorded. Messrs. Hawthornthwaite and Murphy encouraged the claimants to persevere, assuring them that, with right on their side, they would be successful. The following resolution was enthusiastically carried:

"That this meeting emphatically protests against the action of the lieutenant-governor in refusing his assent to the settlers' rights bill and demands that consideration of assent be given forthwith. And be it further resolved, that this meeting protest against any invasion of recognized provincial rights."

PENNSYLVANIA

Anthracite

Scranton—For a number of years I. W. W. agitators have harassed the Jermyn Coal Co. in the operation of its colliery near Scranton, and this, together with the high cost of operation, has caused the company to close down.

Harrisburg—The Pennsylvania Department of Mines announces that no examination of mine inspectors will be held this year. Furthermore, it is stated that the report of this department is still in the hands of the state printer.

Hazleton — Local companies report an increase in New England orders, which were cut off by official rulings during the war.

Wood-pulp pipe in standard sizes has been introduced in this field and will be given a test where acid mine water causes pipe-line trouble.

Dunbar — Damage aggregating $20,000 was caused by fire at the Freeport No. 2 mine of the American Manganese Co. at Dunbar when the tipple, 15 cars loaded with coal, fan house, blacksmith shop, office, repair shop and motor shed were destroyed. It is expected that it will require two months to complete repairs. The origin of the fire has not been ascertained.

Bituminous

Confluence—The Laurel Coal Mining Co., of this place, whose mines are located on the Western Maryland R.R., started about nine months ago to modernize its plant. The improvements are completed and include: An electric plant and Sullivan coal-mining machines and an Ironton storage-battery locomotive. The company expects to materially increase its production. J. H. C. Barr is general manager and W. R. Jones is mine superintendent.

Clearfield—M. D. Kelly, of the Kelly Bros. Coal Co., at Snow Shoe, which has mines at Snow Shoe, Karthaus, Houtzdale, Cherry Run and Kate Glen, a few days ago sold 5500 acres of coal land situated in the lower end of Clearfield County to Pittsburgh capitalists for $225,000. The company intends to make improvements costing $150,000. It is expected the new operations will have an output of two or three thousand tons a day by the first of the year.

Uniontown—Within the past few days it is stated that contracts aggregating 210,000 tons of coal have been placed for railroad fuel, resulting in increased operations at a number of Fayette County mines. There is also a well authenticated rumor in coke circles that four cargoes of export coke have been shipped from this section within the past four weeks.

The Republic Iron and Steel Co. made largely increased coal shipments from its Republic and Martin mines during the first part of this month, though the company is not firing any additional ovens. The Century Coke Co., near Brownsville, fired 50 ovens recently, making the half of their ovens now in blast. The H. C. Frick Coke Co. is also making additional coal shipments. The W. J. Rainey Co. is firing additional ovens at its Allison and Royal plants.

WEST VIRGINIA

Bluefield—Colonel William Leckie, of Welch, recently purchased an office building here with the intention of making it the headquarters and offices of the ten coal companies in which he is interested. It is stated that an annual business of $1,500,000 will be brought to Bluefield by this deal. Colonel Leckie expects to move from Welch and make his home in this place.

Fayetteville—Five hundred and forty acres of coal land in Fayette County have been leased by the Bee Lick Knob Coal Co. from the Sewellmont Coal Co. on a royalty basis, the lease to run for a period of 40 years. Under the terms of the lease, the lessor is to receive a royalty on not less than 20,000 tons for the first year, 40,000 for the second year, and 80,000 for each year thereafter. Royalty is to be at the rate of 15 cents a ton on coal and 22 cents a ton (short) on coke.

Fairmont—C H. Tarleton, manager of the West Virginia division of the Consolidation Coal Co., announced the following changes in mine superintendents which were effective June 1: Robert Heann, in charge of mine No. 55 is transferred to mine No. 24, as superintendent. Vice W. J. Davis, who is transferred to mine No. 43 as foreman, J. H. Nuzzum is to act as superintendent of mine No. 55 until other arrangements are made.

Charleston—A lease on 302 acres of coal land on Lens Creek in Kanawha County has been made to John Steptoe by the Lens Creek Coal Co. for a period of 25 years, the lease including buildings and mining equipment and the consideration being $5000 in cash and $13,000 in promissory notes, a royalty of 30c. a ton to be paid during the life of the notes and 10c. a ton after they are paid. The lessee is required to pay royalty on a minimum production of 24,000 tons.

Page—Beard's Fork is now the center of mining activities for the Loup Creek Collieries. Here the company has two mines developing about 2000 acres of No. 2 Kanawha coal. One tipple is used for both mines, a retarding conveyor having a capacity of 300 tons per hour being used between mines and tipple. Inside equipment consists of Jeffrey and Westinghouse locomotives and Jeffrey short-wall mining machines. There are eight pairs of openings at the north and six pairs at the south mine. The company has also finished construction work on 125 miners' cottages equipped with electricity.

OHIO

Glouster—Chief Deputy Jerome Watson, of the state Department of Mines, and Deputy Inspector Andrew Ginnan are making an inspection of coal mines in this section and in the Hocking Valley. They are especially interested in mines which connect with the workings of adjoining plants. When the inspection is completed these officials will have information to assist them in making recommendations to further safeguard employees in these mines.

ILLINOIS

De Soto—The Peacock Coal Mining Co. is now sinking its main shaft down to the No. 5 seam, which is about 50 ft. below the No. 6 seam. The coal taken from the drill holes shows up so exceptionally well that it is planned to work both of these beds at the same time, which is something that no other mine in southern Illinois is doing.

Duquoin—The J. R. Crowe Coal and Mining Co., of Kansas City, has leased approximately 3500 acres of coal lands located two miles southwest of here. The Crowe company is one of the largest operators in the southwestern district of Kansas, and is also identified with coal interests in Missouri. Engineers are on the ground making a survey to determine the best location for a new mine. The plant will be modernly equipped and will be connected with the Illinois Central R R. This is the first venture in the Illinois fields for the Crowe company.

Niantic—Early on the morning of June 10 fire destroyed nearly all of the upper works of the Niantic Carbon Coal Co.'s plant, near here, causing a loss of $40,000 or more. The origin of the fire is unknown; it was discovered by the mine engineer. Five mules down in the mine were suffocated, but fortunately no men were in the workings at the time. The fire started in the screen house and spread to the other buildings; two carloads of coal also were consumed. Considerable smoke entered the mine but the flames did not penetrate the workings. The mine has been in operation about 30 years and employs 100 miners. The owners of the mine are J. M. Dorcine, David Beggs, Daniel Macknet, Frank Shields, Chester Russell, and B. T. Wagoner. The property was partly insured and will be rebuilt without delay.

Benton—The Chicago, Wilmington & Franklin Coal Co. has purchased from Mr. and Mrs. Robert Williams, of Flint, Mich., the mine here which has been operated by the Benton Coal Co. The consideration is understood to have been about $1,500,000. This gives the company three mines in this section; it recently acquired the Hart-Williams mine and has operated the big colliery at Orient for about six years. The purchase of the two former mines, with mineral rights, links up the properties of the companies from Benton to Orient, some seven miles. The Benton Coal Co.'s mine was sunk about 17 years ago. In the past year improvements costing about $250,000 have been made at this plant, including the installation of a new rescreening plant. In 1918 The Benton company produced 437,364 tons of coal.

Personals

William Littlejohn has been appointed general superintendent of the Utah company, with headquarters at Castle Gate, Utah, in the place of J. S. Thompson, deceased.

E. A. Hitchcock has recently become connected with the Bailey Meter Co., of Cleveland, Ohio, as vice president. He will supervise the training of technical graduates for the company's service and sales departments.

Charles F. O'Hagan, formerly chief engineer of William B. Scaife & Sons, of Pittsburgh, Penn., will be resident engineer and manager of this company's Chicago office when it opens on July 1, as a sales and engineering department.

Mark R. Lamb is at Duquoin, Ill., where he is examining the underground coal loading equipment of the Union Colliery Co., in connection with similar equipment for coal mines in France. At this mine coal is hoisted in skips which permits of large tonnage with moderate rope speed.

M. H. Jones, who has been connected with the Westinghouse Electric and Mfg. Co. for the past 15 years, as assistant to manager of the Philadelphia district, has resigned his position with that company to become sales manager of the Standard Electric and Elevator Co., of Baltimore, Md.

Major Donald Markle, of Hazleton, who served with the Fourth Division in France, resigned, on June 8, from the Cranberry Creek Coal Co. and the Harwood Coal Co., to become general manager of the Blair-Cambria Coal Co. (a bituminous operation), and of the Altoona Northern Railroad, a fourteen-mile line connecting the coal mines with Altoona.

F. R. Lyon has been made a vice president of the Consolidation Coal Co., having been general manager of this concern since 1913. He entered the services of the company as manager of the Maryland division. **A. Brooks Fleming**, who started as a mine superintendent of the company, has been selected as assistant to the president. Mr. Fleming was production manager in northern West Virgina during the war.

Coming Meetings

The Missouri State Retail Coal Merchants' Association will hold its second annual meeting in St. Louis, Mo., on Monday and Tuesday, June 23 and 24, at the Planters' Hotel. Secretary, E. J. Wallace, St. Louis, Mo.

American Institute of Mining and Metallurgical Engineers will hold its fall meeting Sept. 22 to 26 in Chicago, Ill. Chairman Chicago meeting, Carl Scholz, 547 West Jackson Boulevard, Chicago, Ill.

American Institute of Electrical Engineers will hold its annual convention at the Lake Placid Club, Adirondacks, N. Y., June 24 to 27. Secretary, F. L. Hutchinson, 29 West 39th St., New York City.

Northeast Kentucky Welfare and First Aid Association will hold a first-aid contest July 4 at Pikeville, Ky. Secretary, E. H. Sowards, Pikeville, Ky.

The Rocky Mountain Coal Mining Institute will meet in Salt Lake City the first week in July, 1919. Secretary, F. W. Whiteside, Denver, Colo.

Mine Inspectors' Institute of the United States of America will hold its annual meeting July 8 to 11 at Indianapolis, Ind. Secretary, J. W. Paul, Pittsburgh, Penn.

The National Commissary Managers' Association will hold its annual meeting August 5-7 at the Sinton Hotel, Cincinnati, Ohio. Secretary, D. J. Eichoff, Manhattan Building, Chicago, Ill.

Pennsylvania Retail Coal Merchants' Association will hold its annual meeting July 23 and 24 at Reading, Penn. Secretary, W. M. Bertolet, Reading, Penn.

National Exposition of Chemical Industries will hold its fifth annual meeting at the Coliseum and First Regiment Armory, Chicago, Ill., during the week of Sept. 22. Manager, Charles F. Roth, 417 South Dearborn St., Chicago, Ill.

Industrial News

Moundsville, W. Va.—The Dunkard Valley Coal Co. has purchased 7½ acres of land and coal from Davis Powers—consideration $3750.

Baltimore, Md.—The Standard Electric and Elevator, Inc., has opened a New York office at 280 Broadway, in charge of C. A. Yarrington, formerly sales manager of the company.

Cleveland, Ohio—The Lincoln Bonding Co. has opened up a Chicago office at 504 Fisher Bldg. This new branch of the company is under the supervision of W. C. Burdick, sales manager.

Uniontown, Penn.—Negotiations have been completed by the Callahan Coal and Coke Co. for the purchase of a total of 435 acres of coal located in Lower Turkeyfoot Township, Somerset County, formerly held by Harry N. Mitchell.

Senecaville, Ohio—The Akron Coal Co. has awarded the contract to the J. W. Williamson Co., Columbus, for construction of a tipple at the Rigby mine which it will open here. A shaft 175 ft. deep will be necessary.

Thacker, W. Va.—The Thacker Coal and Coke Co.'s plants at this place have resumed operation, after being closed down since Feb. 1. These mines are large producers, employing over 600 men. The company is controlled by the Houston interest.

Ebensburg, Penn.—The Commercial Coal Mining Co. is understood to be arranging for the development of one of its lower seams of coal by a slope opening on its holdings in the vicinity of Red Mills, Blacklick Township, to provide for increased operations.

Pittsburgh, Penn.—The Pittsburgh Coal Co. has recently completed negotiations for the purchase of a tract of coal located at Amwell Township, comprising about 15½ acres, and a site in Canton Township approximating 108 acres. It is said that the company is planning for development.

Sergent, Ky.—It is announced that Jouett, Biglow & Brooks, of Cincinnati, have taken over the Cumberland-Hazard Coal Mining Co.'s property near here. The name of the corporation is to be changed to the Florence Mining Co. and a number of improvements in the plant are contemplated.

New York, N. Y.—The Macomber & Whyte Rope Co., of Kenosha, Wis., announces the opening of a branch office at this place at 30 Church St., under the management of E. E. Robirds. Mr. Robirds has been with this company for 10 years, having been successively manager of the Pittsburgh and Chicago offices.

Portsmouth, O.—The Welston-Hill Coal Co. has recently completed negotiations for the acquirement of the holdings of the Coalton Fuel Co., Washington Township, comprising a total of about 440 acres. It is understood that the new owner will continue operations on an increased scale. Homer Goddard is president and Earl Littler, secretary.

Coal Run, Ky.—C. E. Steele, owner of the Coal Run Coal Co. at this place, and manager also of the Funk Coal Co., at Sutton, Ky., has sold his interest in the Coal Run company to H. H. Funk. Pending the resumption of operations at the Funk company's plant, many repairs have been undertaken and much construction work is in progress so as to fit the mines for increased output when operations are resumed.

New York, N. Y.—The New York Testing Laboratories which have been organized by L. R. Seidell, G. B. Jack, Jr., and H. H. Geist, formerly chief metallurgist, assistant chief metallurgist and chief chemist, respectively, of the Wright-Martin Aircraft Corporation, have in addition to their well equipped laboratories at 354 Mulberry St., Newark, N. J., opened up their New York Offices at 74-80 Washington St. In addition to chemical and physical testing and microphotography, this organization is specializing in the source inspection of materials, and as consultants in smelting, foundry, drop forging and heat treating practices and metallurgical investigation of shop troubles. They are also making chemical investigation of various ore and mineral deposits, their application to industrial purposes and possibilities of marketing same.

MARKET DEPARTMENT

EDITED BY ALEX MOSS

Weekly Review

Buying Improves and Domestic Grades of Soft Coal Strengthen in Price—Labor Problem Promises to Be Difficult of Solution—Mines Working 50 Per Cent. of Capacity —Anthracite Domestic Sizes in Urgent Request

REPORTS coming from the important soft-coal consuming sections indicate that buying is somewhat more pronounced and that there is a tendency toward a strengthening in prices of the high-grade domestic bituminous coals. The matter of disposing of the steam sizes still remains a problem, however, though both the producing and marketing interests maintain their feeling of confidence that there will be a decided betterment shortly.

Stocks of soft coal in the hands of consumers are not exhausted. Probably only one-third of the reserves held in storage at the beginning of the year still remains yet users are unwilling to contract for their future requirements at the prices quoted by the operators.

The labor question grows more serious with the exodus of miners and the unwillingness of many of them to work full time. By next fall and winter the operations will be unable to work to more than 75 per cent. of full-time capacity, owing to the inadequate labor supply. In addition, it is doubtful if the railroads will be in a position to handle the full movement of coal and other freight this winter, for reasons that are obvious.

Operations are now running at about 50 per cent. or so, on an average, though some mines are working more than others. During the week ended June 7 nearly 9,000,000 net tons of soft coal were produced. The estimated production of bituminous coal for the calendar year to June 7 is 186,278,000 net tons compared to 247,196,000 net tons for the same period of 1918.

Complaint is general of the shortage of the domestic sizes of anthracite. Stove and egg, in the order named, are the sizes in greatest request, with chestnut running a close third. It is likely that by the end of the year consumers who are now so insistent on receiving these coals will have to resort to the use of different sizes, as it seems to be a foregone conclusion that production of the domestic grades of hard coal will not be able to catch up with the demand this year.

Steam coals move more slowly, and not much improvement is looked for until the winter sets in. Many operators are commencing to store these small coals at the mines against the time when consumers will be in the market for them.

The output of hard coal in the week ended June 7 totals 1,695,000 net tons. For the calendar year to June 7 the production of anthracite is estimated at 33,349,500 net tons, compared with 42,858,000 for the corresponding period of last year.

WEEKLY COAL PRODUCTION

The production of bituminous coal in the week ended June 7 is established at nearly 9,000,000 net tons, an increase over the week ended May 31, in which Memorial Day was observed as a holiday in some of the districts, of about 1,000,000 tons, and an increase over the week ended May 24 of 200,000 tons or 2.5 per cent. The production in the week ended June 7, 1919, was 3,635,000 tons or 29 per cent. less than in the corresponding week of 1918.

The average daily production per working day for the week ended June 7 was 1,488,000 tons compared with 1,456,000 tons in the week ended May 24. Reports of working time received from the operators for the week ended May 31 indicate that on the average over the country about one-half day in that week is to be considered as having been a holiday and that the average daily output in the week ended May 31 should be calculated on the basis of 5.5 working days. The estimated production of bituminous coal for the calendar year to June 7 is 186,278,000 tons compared with 247,196,000 tons for the same period of last year.

The production of anthracite in the week ended June 6 is estimated at 1,695,000 net tons compared with 1,285,000 net tons in the week ended May 31, and 1,656,000 in the week ended May 24. The production in the first week of June, 1918, was estimated at 2,034,000 net tons. The production for the calendar year to date is 33,349,500 net tons compared with 42,858,000 for the corresponding period of last year.

The production of beehive coke in the United States is estimated at 269,000 net tons for the week ended June 7, an increase compared with 264,500 tons in the week ended May 31, but below the output of 660,000 tons in the week ended June 8, 1918. Production of beehive coke this year to date is estimated at 8,750,000 tons compared with 13,207,000 tons in the same period of last year. All of the eastern districts report increases in the week ended June 7 compared with the last week in May, and the districts west of the Mississippi report decreases.

Bituminous coal dumped at lower lake ports in the week ended May 31, 1,004,753 net tons, was the record week for this year and the first week in which the million-ton mark was passed. The dumpings in the last week of May this year exceed the record for the last week of May, 1918, by more than 300,000 tons. The total coal forwarded from lower lake ports to the end of May is more than 5,000,000 tons and exceeds the movement of cargo coal last year by nearly three quarter million tons.

Atlantic Seaboard

BOSTON

No distinct change but undertone continues favorable. Reports of labor shortage are a factor in current situation. Postponement of navy's decision restricts volume of high-grade coals for open market. Other grades continue druggy. Dull market via New York and Philadelphia piers. Strike of trimmers at Norfolk interrupts shipments. Railroad purchases continue talk of the trade. Anthracite shipments disappointing.

Bituminous—The week has disclosed no significant change in market conditions. In most cases operators are still soliciting orders for June and July, although there are distinctly fewer contract offerings than a fortnight ago. Trade is light in practically every direction, but there is now a pronounced undertone that seems to forecast higher prices in the fall. Shippers have been arguing this for so long a period that not many buyers are impressed, but undeniably there has already begun a new spurt in buying for future needs. Large steam-users who have been marking time and trying coals have now come into the market for more or less comprehensive tonnages. The movement all-rail has not yet begun to show a material increase, but figures on July 1 should prove that there has been additional buying since June came in. The larger share of this increase in receipts will be for the high grades from Central Pennsylvania. Certain of these coals are now practically out of the market, and although medium and low grades are still to be had at prices well down to $2, it is expected that the generally improved state of the market will react on these as well before many weeks have elapsed.

Already there are reports of labor shortage in the region. At some operations where there has been a consistent effort for months to dispose of current output these efforts have now been relaxed because there are more spot orders on file than can conveniently be shipped. There are several instances where agencies in this territory have been obliged to cease selling for prompt shipment to permit the mines to catch up on production. When this happens in June it is a good sign and there are few in the trade who do not now predict freely that something like a "broad" market will prevail in October, if not before.

The Navy Department has not yet reached a decision, apparently, on the coals to be taken at New York under the proposals opened on May 29, and in consequence there are several shippers "in the air" as to the volume of commercial coal they will have available. As a matter of fact the delay, together with labor uncertainty, enables operators to withhold sales until a time when spot coal will almost certainly sell at a considerably higher level. Obviously, from now on, the quality grades from Central Pennsylvania will have sufficient demand for what coal can be mined. The Government is sure to get its quota, and coals on the accepted list will not go begging very much longer.

On the other hand, there are many producers of medium and poor grades who continue with difficulty to run their mines but two or three days a week. This territory is still being combed over for spot orders, and price inducements are being made as freely as at any time since January. Fairmont grades can be bought at $1.85@2 per net ton f.o.b. mines, and there is no dearth of Clearfield coal at $2.15 upward. The trend of buying here is toward the best coals for the money and there is bound to be only a narrow market for high-volatile or high-ash coals until the better grades cease to be offered. Meanwhile, the demand is certain to be inactive.

At the New York piers the demand is also dull and lifeless. Aside from bunker-

ing the tonnage dumped is light and relatively only a small volume is moving either on Long Island Sound or to Boston and the points eastward. At Philadelphia the movement is practically confined to locomotive fuel for such roads as the Maine Central, the Bangor & Aroostook, Canadian Pacific and others. Eastern dealers are not sparing any space from anthracite, under present conditions, and no shippers dare send coal to the Philadelphia piers without orders and marine transportation in hand. The result is that for the most part coal is coming down from the mines only on special order. From Philadelphia it is now practically impossible to secure Reading barges for commercial bituminous, so large a proportion of the fleet having been allocated to the railroads for engine fuel.

The trimmers' strike at Norfolk has been the outstanding fact in Pocahontas and New River distribution the past week. This has meant practically a cessation of loading for several days and in other times would have meant serious interruption in the flow of coal. The agencies have done what they could to shift steamers to other piers and they have also discontinued chartering steamers and barges on a trip-to-trip basis. There has been practically no effect on the situation here, for the southern coals this year are cutting only a very light figure in the New England market.

The more that is learned about railroad purchases in this territory the greater is the amazement that regular channels of supply over long periods have been utterly discarded. Instead, contracts have been placed with a large number of shippers, many of them jobbers in New York and Philadelphia, who are little known in this market and have their experience mostly ahead of them. The remote districts were canvassed in the effort to get bids low enough to suit the controlling authority and it remains to be seen whether the outcome will really cost less than had the coal been purchased of customary sources.

Current quotations on bituminous at wholesale range about as follows:

	Clearfields	Cambrias and Somersets
F.o.b. mines, net tons	$2.15@2.75	$2.75@3.35
F.o.b. Philadelphia, gross tons	4.27@4.95	4.95@5.50
F.o.b. New York, gross tons	4.62@5.29	5.29@5.85
Alongside Boston (water coal), gross tons	6.10@6.85	6.90@7.35

Georges Creek is quoted at $3.20 per net ton f.o.b. mines.

Pocahontas and New River are being quoted at $5.04@5.24 per gross ton f.o.b. Norfolk and Newport News, Va. Alongside Boston the same grades are being offered at a range of from $7.24@7.44, and on cars Boston and Providence at from $7.50@7.90 per gross ton, the latter being the contract price f.o.b. cars for deliveries to April 1.

Anthracite—The first half of June has proved most disappointing to New England dealers. Instead of shipments being increased they have seemed regularly to diminish, especially on egg and stove, the sizes in greatest demand. There has also been increasing anxiety over the very heavy proportion of barges being used to carry bituminous. Shippers who have regularly supplied the market are turning the coal in other directions and chartering their barges wherever an order can be had. The Reading fleet, upon which a large number of retailers have always relied, is bringing forward less anthracite than ever, and as the season advances they are beginning to see the full force of the decree that these barges must carry a heavy tonnage of railroad fuel. The same functionaries who experimented with the movement of these barges from Port Reading instead of from Port Richmond are responsible for this further interference with one of New England's most dependable avenues of supply.

NEW YORK

Dealers complain of lack of domestic coals. Egg, stove and chestnut becoming scarcer and the trade looks for greater shortage as season advances. Shipments to this market continue on even basis. All sections of the country receiving anthracite. Steam coals drug the market and prices are easy. Bituminous tidewater market soft but the trade retains its confidence that business will improve. Line trade picking up and some coals are quoted higher than last week.

Anthracite—Everywhere is heard the complaint of the lack of domestic coals, and there is no reason to expect that they will diminish as the season advances. There has been no improvement in the situation although the shipments of anthracite for May show a substantial increase over those for April, and this in spite of the fact that the mines were idle on several holidays.

Shipments to this market continue on about the same basis as for the past several weeks. This is due, no doubt, to the desire of the trade to take care of the outlying districts. It must also be remembered that the sections of the country that did not receive anthracite during the war period by order of the Fuel Administration are now taking their usual prewar tonnage. Considerable coal is being sent into Canada as well as westward. It is reported that some Canadian dealers have offered premiums for quick shipments.

The call for stove, egg and chestnut, in the order named, keeps up. There is a decided shortage of the two first-named sizes and dealers are urging their customers to substitute some of the other sizes. While there has not been much willingness displayed in agreeing to the suggestion, it is likely to be generally accepted this fall unless production picks up considerably between now and the time to start furnace fires. During the war there was considerable substitution of sizes and the consumer learned much about burning the various sizes of coal.

This market obtained a few hundred cars of anthracite more last week than the previous week, according to the report of dumpings at the local railroad docks. During the week ended June 13 there were dumped 5691 cars as compared with 5380 cars the previous week, an increase of 311 cars. On June 13 there were on hand 3112 cars of anthracite as against 3007 cars on June 6, an increase of 105 cars.

Disposal of the so-called Independent product is an easy matter these days. It is not a question of salesmanship as the orders come into the offices. Considerable of these coals are bringing premiums ranging all the way to 50c. per ton, according to current reports, but some orders taken early in the year are being filled at the prices current at that time.

The steam coals are becoming a drug on the market. They are extremely weak, with small opportunity of the market showing much improvement until cold weather. There is a belief that those operators who have not already started will soon commence the storing of these coals at the mines. The larger companies with storage places have already stored considerable.

Current quotations, white ash, per gross ton at the mines, f.o.b. tidewater, at the lower ports, are as follows:

	Mine	Company Circular
Broken	$5.95	$7.80
Egg	6.05	7.90
Stove	6.30	8.15
Chestnut	6.40	8.25
Pea	5 00	6.75
Buckwheat	3.40	5.15
Rice	2.75	4.50
Barley	2.25	4.00

Bituminous—The market is soft, yet the trade maintains its confidence that there will be a decided improvement shortly. Evidences of this change for the better come from salesmen who have visited the inland dealers. They report buying better and a strengthening of prices. So far as this tidewater market goes, there is a decided dullness, with quotations on the various pools far from normal. Movement is slow, many idle boats lying in the harbor.

There were not so many loaded cars at the various railroad docks on June 13 as on the corresponding day of the previous week, the reports showing 4394 cars on hand as against 4664 cars on June 6, a decrease of 270 cars, while for the same period there was a falling off of cars dumped, the reports showing 5748 cars dumped as compared with 6511 cars the previous week, a decrease of 763 cars.

Shippers of coal from certain districts are refusing quotations, asking the prospective buyer for offers. This tends to show that the miners of these coals are not over-supplied with free coals of the better quality and it may also show their hopes in the future.

Handlers of bunker coals are complaining of the loss of business through the absence of ample pier facilities. In the last days of last week there were nearly 50 vessels lying in the harbor waiting for piers at which they could tie up. This lack of piers, it is claimed, has caused many owners of vessels to send their boats to Baltimore and other shipping ports along the coast. Because of this the coal trade here has lost considerable bunker business, some of which will never return to this market.

Quotations for Fairmont and Westmoreland coals are stronger than for the past few weeks and shippers report many more inquiries.

Reports from the mining regions show that labor is in better shape and that because of the increase of orders along the line the mines are working about 65 per cent.

With conditions showing a gradual improvement, Central Pennsylvania miners look for a change in that section.

Quotations on the various coals are about as follows:

	Spot	Contract
South Forks	$2.90@$3.25	$2.95@$3.50
Cambria County (good)	2.75@ 2.95	2.95@ 3.25
Clearfield County (good)	2.50@ 2.75	2.80@ 2.95
Reynoldsville	2.50@ 2.75	2.75@ 2.95
Quemahoning	2.65@ 2.85	2.95@ 3.10
Somerset County (best)	2.65@ 2.85	2.95@ 3.10
Somerset County (poor)	2.00@ 2.35	2.50@ 2.75
Western Maryland	2.25@ 2.50	2.50@ 2.75
Fairmont	2.00@ 2.25	2.35@ 2.60
Latrobe	2.10@ 2.25	2.25@ 2.40
Greensburg	2.25@ 2.35	2.35@ 2.60
Westmoreland ¾-in.	2.60@ 2.75	2.75@ 3.00
Westmoreland run-of-mine	2.35@ 2.60	2.60@ 2.85

PHILADELPHIA

Anthracite demand gains in volume. Orders unfilled. Demand for family sizes expected to run all summer. Individual prices advanced. Increases cause concern. Consumer demand dwindles. Stove hard to get, egg scarce, chestnut in moderate supply, and pea well cared for. Buckwheat shows strength. Rice and barley unimproved. Bituminous unchanged. Good grades strong. Prices well maintained. Little contracting. Fair spot trade.

Anthracite—Real summer weather fails to hold back the anthracite trade. This is particularly noticeable from the producing end, where all companies have more orders on their books than they can fill for weeks. While not at all serious at this time, there can be no doubt nevertheless that all mines could use more inside men. For outside work there is little difficulty in procuring men. Yet despite the efforts of the operators they are unable to get production up to the point that the present situation justifies, and even now forecasts are being made as to what will happen next fall if the operating department is unable to get out the tonnage somewhat near the maximum established during the war.

As to the present situation on family sizes, all producers are extremely confident that the demand for the larger sizes will continue indefinitely. The calls upon them continue from all markets and shippers point out that at the present rate of production it will be impossible to satisfy them during the coming summer.

The fact that some operators are charging premiums of from 15c. to 30c. per ton above company circular tells a tale. As a matter of fact, several of the independents have come out with announcements to their regular trade of an advance of 10c. per ton above circular, and in some cases even 20c. The impression seems to prevail now that the individual operators will all be at least 75c. a ton above company prices by the time frost arrives, if not sooner. In this connection we have in mind one large operation whose production is sold through a middle house, and the coal is netting the producers 15c. above the recognized circular. In other years this coal was often sold in block tonnages in April or May with the prices of those months protected up to September or October, and the agents' commissions were paid out of those rates. For occasional blocks of coal we know that some houses are refusing offers of 50c. per ton advance over current circular, and that more conservative operators are criticizing those who are inclined to accept business at fancy figures.

Locally the market continues short, but the dealers report a rapid falling off in new business. Some retailers when asked to make an estimate stated they do not believe that more than 70 per cent. of the consumers accustomed to buy at this time of the year have as yet placed their orders. One of the very largest retailers placed his estimate as low as 60 per cent. Dealers generally report lack of interest on the part of the householders, particularly the small buyers, and express their determination to continue all summer their efforts to

fill their bins before fall, by which time it is expected the scramble for coal will be renewed. The one great drawback to this plan is that most of the small consumers, being house renters, are not at all certain as to where they are going to live by the time coal-burning weather arrives again. Certainly the outlook for the future is not at all hopeful, and most representative dealers express the belief that only a mild winter will prevent great inconvenience and higher prices.

Egg continues extremely short and really cannot become plentiful, because the New England market and the South in the vicinity of Baltimore and Washington are calling for enormous tonnages. Stove appears positively hopeless, with most dealers entirely out of it; certainly few have what could be called a stock, and the dealers here are tormenting the shippers for it. All shipping offices say the demand from every market is equally great. Chestnut is very far from weak, but is in greater supply than either stove or egg. Shippers say that it is not likely that the demand from western markets can be filled all summer. We have even heard of first-class washery nut bringing full price. Pea remains in very fair shape and shippers report orders in hand for several weeks in advance. We know of one individual house that has actually refused to take on any new business for this size. Of course, the pea that the dealers take in is not being delivered, but is being stored away for winter delivery, as has been their custom for years, most dealers having given up hopes of filling this storage space with chestnut.

The buckwheat market has strengthened during the past week. The poorer grades are being offered from $2.65 to $2.85, while $3.25 to $3.40 is being asked for first-class coals. The big companies are considering no bulk business at less than $3.40, and we are inclined to the opinion that no first-class buckwheat is being sold at reduced prices for shipment beyond sixty or ninety days. Rice shows little strength and orders are accepted around $2.50 for spot shipment. Heavy tonnages are going into the big storage yards while the smaller operators are piling it up at the mines. The same practically holds good for barley, which has been offered at $1.35 recently. However, shippers are taking a cheerful attitude on the situation, and one of the very largest houses advised us they look for greatly improved conditions in all junior sizes within sixty or ninety days, particularly as the outlook for increased steel production is so promising.

Bituminous—The soft-coal situation is almost colorless, if we except the tendency of the high-grade coals to grow scarcer, with the consequent well-held prices for such grades. Cheap coals continue plentiful, and we have heard of quotations on occasional lots as low as $1.80.

Consumers generally seem to be stirring themselves and endeavoring to place themselves in position to buy at the most favorable prices. Many of them want to barter for fuel somewhat on the basis of railroad fuel prices, which are published and are known by all interested in fuel. Of course, it is beyond all reason to sell commercial coal at anything near such prices, especially fine grades of coal.

Contracting seems to have reached almost the minimum for the season, with the bulk of transactions being on a spot basis recently.

BALTIMORE

Export trade shows material increase. Domestic trade inactive. Rumors of large combine.

Although domestic business has been light during the week, the export situation has gone ahead remarkably fast and to such an extent that the indications are that June will be a record month for coal exporting. During the first week of June 40,169 tons cargo and 4505 tons bunker left this port, and within the next two weeks allocation of steamers from this port show that 42 vessels will carry coal to foreign ports. The 42 vessels are the share of 56 steamers that have been allocated for foreign business from this port by the United States Shipping Board. But one steamer will go to South America, the others will be distributed as follows: Gothenberg, 17; Rotterdam, 16; Stockholm, 5; and Genoa, 3. The 56 vessels will carry 280,000 tons from this port and it is estimated that the share of the vessels carrying coal will approximate 200,000. The allocation of coal is expected to be increased materially before the month is past, which makes it appear to observers that this will be a real month's business for the export coal men here.

Despite this heavy shipment of coals there is still little foreign contracting, although the air is full of nibbling with no real bites. The only contracting reported here is that of the 3,000,000 tons for Italy, which was made about two weeks ago.

Failure of any real demand for coals keeps the domestic market inactive. At many points where formerly large tonnages of bituminous coal were used, oil is now being purchased as fuel. Dealers estimate that at least a quarter of a million of tons of coal less will be required in industries here because of the installing of oil-burning boilers. Bethlehem Steel Co. use coal only in the coke ovens, while the Standard Oil Co., United States Industrial Alcohol Co. and other plants all use oil in place of coal.

The best grade of coals at spot brought $2.75 and down to $2.50, while the medium grade fuels sold around $2.30, with no one desiring the low-grade fuels, which went as low as $1.90. Baltimore City has 8000 tons of bituminous, which was bought during the war, but which various departments are objecting to and declining to use. There is some talk of the city selling it on the open market.

The anthracite dealers are still worrying along with low receipts. Large dealers are worse off than the small ones because the equipment of the big firms is idle a great part of the time. Householders will have at least a 25c. increase tacked on July 1, and this may go higher. The belief is general that the independent operators will attempt to force up the price, and during the week one dealer was approached by an independent operator, who offered to furnish all the coal the dealer wanted at a 65c. premium per ton. There is a rumor that there will be a combination of a half dozen firms into one large corporation. The plans provide for a center office downtown with distributing points in all sections of the city. This is the second time within less than half a dozen years that this report has been made. It fell through previously because of inflated values placed by some of the firms on their business. This year the belief is strong that it is likely to be consummated.

Lake Markets

PITTSBURGH

Consumers still unwilling to contract. Labor shortage threatens, also railroad difficulty, next fall and winter. Market prices unchanged.

Line consumers do not show any greater disposition to take hold in the matter of contracting for coal. While operators are talking strongly of higher prices late in the year, there is reason to suspect they would prefer consumers to place contract at prices determined by operators. Stocks in the hands of consumers are not yet exhausted, though probably at least two-thirds of the stocks held at the beginning of the year are gone. Operators contend that consumers should carry not only the stocks now held but even large stocks on the ground that it is very improbable that there can be capacity operation of the coal mines of the district next winter, and such an operation would be required to supply the industries if they have full activity as they seem to expect.

The labor situation grows more serious with the exodus of miners and the unwillingness to work full time. Some operators express doubts whether, with all other conditions favorable, the labor supply would permit of more than a 75 per cent. operation by next fall and winter. Apart from this is the railroad situation, it being doubtful whether the railroads in their present condition could handle a full movement of coal and other freight even if the winter were milder than usual. Operations are now running at 50 per cent. or a trifle more, on an average, but some mines are running much better than others.

For prompt and early deliveries prices are as formerly quoted: Best grades gas coal: Slack, $1.65@1.85; mine-run, $2.35; prepared sizes, $2.60@2.70; Steam: Slack, $1.50@1.70; mine-run, $1.90@2.35, per net ton at mine, Pittsburgh district. Steam mine-run on contract to the end of the coal year is very firm at $2.35 as minimum, and with higher prices predicted.

BUFFALO

Slight improvement in bituminous. Not much stir looked for right away. Industries do not move. Anthracite mining still slow. Demand heavy. Lake shipments keep up fairly well, though not as great as desired.

Bituminous—The demand may be said to increase slightly, but there is nothing looking like a stir in sight. The volume of manufacturing is not large, and it is so disturbed by labor troubles that even an intended amount of output is often not reached. This affects the coal trade directly and postpones the day of recovery. That it is not far off is agreed. In fact the operator especially, and the jobber to a certain extent, is optimistic and will have it no other way than that we are on the eve of a rapid movement of bituminous coal.

The Buffalo jobber is not enthusiastic. Too many complications keep coming up for business to return to the normal just yet. Traveling salesmen go out much as formerly and good ones make sales, but it would be useless for a new man to try the road now. He would make no profits. The consumer is still looking for lower prices.

The mines have already made more concessions than they should, and all that they have accomplished is to cut down their narrow margin of profit. They have not increased the general volume of business and it is doubtful if in the long run they have increased their own. Quotations remain at $4.55 for thin-vein Allegheny Valley, all sizes; $4.45 for Pittsburgh and No. 8 lump; $4.30 for three-quarter; $4.05 for mine-run and $3.65 for all slack, per net ton, f.o.b. Buffalo.

Anthracite—The trade is still short of coal. No improvement is in sight, unless it be that the local demand is lighter. More coal has been bought so far by consumers than usual, and that would seem to account for the continual report of shortage but for the mine report, as shown by the Government bulletins, that mining is less now than it has been in six years. If the consumer has learned to economize and use substitutes enough to make up for this shortage, he may get through the winter safely; but it is to be feared that he has not, in which case the dependence must be on another mild winter.

The June prices of anthracite are as follows:

	F.o.b. Cars, Gross Tons	At Curb Net Tons
Grate	$8 55	$10 20
Egg	8 65	10 40
Stove	8 90	10 60
Chestnut	9 90	10 70
Pea	7 20	9 15
Buckwheat	5 70	7.75

Lake shipments keep up only fairly well. The demand is too general and too heavy for shippers to get as much coal for the lakes as they would like. The amount loaded for the week was 86,900 net tons, of which 38,600 tons cleared for Chicago, 6000 tons for Green Bay, 3800 tons for Racine, 18,200 tons for Duluth and Superior, 12,000 tons for Fort William, 8300 tons for Hubbell.

Freight rates remain quiet at 80c. to Racine, 50c. for Chicago and Green Bay, 42½c. for Duluth, Fort William and Hubbell.

CLEVELAND

Prices are stiffening, with Pocahontas and anthracite increasingly difficult to obtain. Operators are more inclined to shove up their quotations on slack and mine-run, with slack more easy now to dispose of. Upper lake dock operators are taking all the bituminous coal they can obtain, although coal is not moving so freely off the upper lake docks.

Bituminous—Business appears to be opening up in all directions. The iron and steel industry—the largest single user of coal in northern Ohio—is rapidly getting under way, and much pig iron and all varieties of finished material are being sold in big tonnages. The prediction that Aug. 1 will see the industry at 100 per cent. operations still holds, and each succeeding week sees its coal and coke consumption increasing. Purchasing agents of the larger mills now are waking up to the situation and suggestions that they had better cover for the remainder of the year are having effect. Some operators believe that within two weeks many of the larger steam-coal consumers will have placed their contracts.

Slack is much firmer in price, and while some still can be had at $1.90, it is believed $2 more nearly represents the market. Not much will be sold at that figure, is the prediction. Some operators look for slack to go to at least $2.50 in the early part of the winter. Mine-run and prepared sizes are also reflecting improved conditions, and mine-run is now bringing $2.10 and up at the mines, with most of it averaging between $2 and $2.10. With each succeeding week showing production far behind last year, coal interests can see nothing but enormous demand coming out in the last half year, with a runaway market the obvious result. The labor situation at southern and eastern Ohio mines continues bad, and most operations can do no better than 55 to 60 per cent. of capacity with their present forces. This situation is one that will grow much worse before it becomes better, it is feared.

While retail dealers have been able to obtain an adequate supply of domestic bituminous, they are complaining of the difficulty in meeting the demand for anthracite and Pocahontas. The coarser grades of Pocahontas seem especially scarce. Domestic demand keeps far ahead of the normal summer business. Some dealers, it develops, have not yet increased their anthracite prices, but on July 1 they plan a 30c. advance in order to catch up with the procession.

Lake Trade—Lake Erie car dumpers continue to handle about 900,000 tons of bituminous coal weekly, making the monthly totals under 4,000,000 tons. In May, the lake carriers took 3,821,295 tons of bituminous for the head of the lakes. This week the docks are dumping from 3000 to 3200 cars daily. Coal is reported not moving so freely off upper lake docks as might be hoped. Demand for lake coal has not abated, and operators are finding a ready market for every car they dispatch to Lake Erie ports.

Price of coal per net ton delivered in Cleveland, is:

Anthracite:	
Egg	$10.85@11.05
Chestnut	11.15@11.35
Grate	11.05
Stove	11.05@11.25
Pocahontas:	
Forked	9.00
Lump	8.25
Mine-run	7.20
Domestic Bituminous:	
West Virginia splint	7.75@ 8.00
No. 8 Pittsburgh	6.10@ 6.35
Massillon lump	7.30@ 7.40
Steam Coal:	
No. 6 slack	4.20@ 4.40
No. 8 slack	4.70@ 4.95
Youghiogheny slack	4.85@ 5.15
No. 8 ¾-in.	5.40@ 5.55
No. 6 mine-run	4.40@ 4.50
No. 8 mine-run	4.80@ 4.95

DETROIT

Steam-coal buyers are still maintaining a waiting attitude, though a fair demand for domestic stock is reported.

Bituminous—Realization of the advantages of buying their coal supply at present apparently has not yet become general among the Detroit consumers of steam coal. Jobbers and wholesalers say there is only a small volume of business being transacted and that buyers are continuing the attitude of aloofness that has been characteristic of the local situation for some weeks.

It is a theory among some of the jobbers that the users of steam coal are waiting in the expectation of cheaper coal coming into the market. Jobbers insist such a development is highly improbable and explain that the delay in releasing orders will mean an accumulation of business later that will tend to produce an advance in prices, when the buying movement sets in, due to the lack of mine reserves and limitations on output imposed by shortage of labor.

Though there is apparently some increase in amount of free coal on tracks, shipments are said to consist largely of slack and fine coal for which there seems little demand, the result being a weakening of prices. While quotations on Ohio slack are reported as $1.50 and on the West Virginia product at $1.85 to $2 a net ton at the mines, jobbers say there are rumors of sales having been made around $1.25 and even lower, in the effort to escape the heavy demurrage accruals.

Mine-run is quoted at $2 for Ohio stock and $2.10 to $2.25 for West Virginia coal, while smokeless holds around $2.75 to $3. Hocking domestic lump is reported selling at about $2.50, with West Virginia gas and splint lump at $2.75 and three-quarter lump at $2.50.

Anthracite—Extremely hot weather during the last few days has somewhat reduced the inquiry for anthracite. Retailers are making an active campaign to encourage early distribution among household consumers.

Lake Trade—Shipments over the lake routes are holding considerable volume and for the week ending June 7 a record for the season was attained, with the loading of 1,122,322 tons of cargo and 46 007 tons of fuel coal, a total of 1,168,329 tons. Toledo, Ashtabula and Lorain, in the order named, were the heaviest shippers.

COLUMBUS

There is increasing evidence of activity in the Ohio coal trade. Inquiries for steam grades are more numerous, indicating a disposition on the part of big users to buy. Domestic grades are stronger and the lake trade is progressing satisfactorily. Prices are still uncertain.

The best feature of the Ohio coal trade during the past week is the increase in the domestic demand. Retailers are gradually increasing their stocks in order to take care of the expected rush in business when the stocking-up season opens. Retail stocks are not large in any section, and consequently there is a general movement to buy. The large part of the orders booked are for the fancy grades, such as Pocahontas and West Virginia splints. Kentucky grades are also in better demand for stocking purposes. As Hocking is not stocked a great deal at this time, there is no important buying movement. Prices for the better grades of lump range higher and all recent advances are well maintained. Pocahontas lump is selling between $4.50 and $5 at the mines, and is scarce at that.

The steam trade is also showing signs of awakening. As industrial conditions slowly improve there is a better demand for steam sizes. This has been noticeable during the past week and the result has been to diminish the over-supply of screenings which has been a drug on the market. But Screenings are still cheap and some extremely low quotations are heard. Iron and steel plants are slowly resuming and are buying a large tonnage for fuel purposes. Rubber factories have about used up their reserve stocks and will soon be in the market.

Production is better in practically all of the Ohio fields. This is most noticeable in the eastern Ohio field, where the output is now estimated at 80 per cent. of normal. In the Hocking Valley and Pomeroy Bend fields the output is between 65 and 70 per cent. and gradually increasing. Other fields are showing up fairly well with prospects of an increase within the coming six months.

The Lake trade is showing considerable activity. Loadings at the lower lake docks are good, and it is claimed that the movement from Ohio ports to date is ahead of last year's shipments. Vessels are plentiful and chartering is going on fairly well. Owing to unsettled prices, contracting for Lake tonnage is not being done on a large scale.

Retail prices delivered in Columbus are:

Hocking lump	$5.50 to $5.75
Pomeroy Bend lump	5.95
Island Creek	6.25
White ash	6.25
Splints, lump	6.00 to 6.50
Kentucky Wheeling Creek	6.75
Semi-smokeless	6.75
Pocahontas	7.00 to 7.25

LOUISVILLE

Block coal in good demand, with operators forcing prices upward to check demand. Screenings hard to dispose of, resulting in dumping at mines in many instances.

The demand for block coal has been so keen since domestic consumers started stocking, and retailers began buying heavily, that some mines are forcing prices up on all new business, owing to the fact that in handling additional block business they are unable to dispose of the accumulated screenings, which have to be dumped at the mine. This will mean rehandling, with the result that better prices must be had to take care of the additional costs. A fair volume of block business can be handled, and screenings sold on a spot market, but with increased block the operator is helpless in the matter of forcing out his screenings, as the market cannot absorb the supply.

A number of operators are forcing retailers to take a car or two of screenings with every car of block in order to lessen the burden. The coal is screened for the retailer, relieving him of the difficulty of hand-forking, and it is felt that under existing conditions he should be willing to aid the operator.

Eastern Kentucky operating conditions are fair, as there is a big demand for block, a fair demand from the lake region, and an increasing demand from byproducts, gas and other plants. Little coal is moving south for bunkering, although some coal is going to textile plants. However, steel and iron plants, cement manufacturers, brick plants and many others are buying small tonnages.

Western Kentucky is hard hit the way things are now going. Owing to the fact that freight rates favor eastern Kentucky coals, and due to the higher grades of these coals that are selling at low prices, western Kentucky has not a large or ready market, but operators are unable to cut prices much more because of the high overhead. The result is that mines are operating one to two days a week, with many of them down. This makes it difficult to hold labor, which is shifting to the eastern Kentucky fields, where the supply is not equal to the demand.

The car supply is becoming a little short, and is giving many operators uneasiness. The heavy movement to the Northwest and lakes this year has kept many cars in transit for long intervals, and considering the fact that there are several hundred cars moving out daily, the outlook is not especially promising.

Quotations are: Eastern Kentucky, block, $3.25@3.50; mine-run, $1.90@2.40; nut and slack, $1.50@2. Western Kentucky, lump, $2.25@2.55; mine-run, $1.85@2.10; nut and slack, $1.75@1.85; screenings, $1.45@1.75, according to size.

BIRMINGHAM

Steam market remains inactive, little spot business being booked. Lump coal very strong and hard to get. Supply very much restricted on account of lack of steam orders at the mines.

The past week has shown no improvement in the demand on this district for steam coal. A large number of railroad contracts expire June 30 and will come up for renewal in the next week or so, though no action has thus far been taken by the rail lines to provide for the fuel requirements for the next twelve months as covered by the expiring agreements. Commercial trade will most likely be favorably affected by the closing of contracts for the needs of the railroads.

Domestic dealers are finding it difficult to secure the desired amount of lump coal, and the scarcity of domestic sizes is such that only now and then can a car be picked up in the spot market. With an improvement in the steam trade this condition will be relieved to some extent, but coal men predict that the shortage this winter will be more keenly felt than in any previous years. Consumers are not buying heavily at this time but nevertheless dealers have not been able to accumulate much coal on their yards.

Some increase in production will be shown by the furnace companies due to the placing of several stacks in commission which have been out of blast for some months on account of the dull iron market, which is now showing gradual improvement.

Coke

CONNELLSVILLE

Contract negotiations for furnace coke, with uncertainty as to outcome. Some furnaces may switch to byproduct coke. Prompt coke firmer.

If the coke market follows the views of Connellsville coke operators as to contracts for the second half of the year it is going to be a very strong one, but the matter is not decided yet. What may be considered negotiations on second half furnace coke have been under way, but they have consisted chiefly in operators giving their views to consumers, in a few cases perhaps naming flat prices, but in the majority of cases proposing sliding scale contracts of various forms. The sanguine feeling pervading the ranks of operators is illustrated by the case of one, who is unwilling to sell for the whole half year but hopes to find a customer for the third quarter. Since the expectation is that pig

iron production will increase up to the close of the year, it is the latter portion of the half year that consumers would be particularly interested in covering against, not the third quarter.

Some eastern Pennsylvania furnaces have been heard from with a statement that if they cannot buy Connellsville coke for the half year at about $3.85 they will not buy it at all, but will depend upon byproduct coke made in the East. They are now offered Bethlehem coke on an iron-bound contract as to deliveries, to offset the operating difficulty the Bethlehem company had some time ago, and there is also the Midvale operation, which is expected to be completed next month. Connellsville operators have no thought of selling even at $4 as a flat price for the half year. Ratio contracts of various sorts are proposed, one being on a 6 to 1 basis—that is, if basic pig iron is $25, valley, which is the approximate price now, the coke would be priced at $4.17. There are various details, relating to maximum and minimum prices and other limitations.

The spot furnace coke market is firmer, it being altogether exceptional for any coke to be available at under $4, while foundry coke readily brings $4.50 for very ordinary grades, and $4.75 and $5 for the better grades. There is nothing very definite as to foundry coke contract prices.

We quote spot and prompt coke at $4 for furnace and $4.50@5 for foundry, per net ton at ovens.

The "Courier" reports production in the Connellsville and Lower Connellsville regions in the week ended June 7 at 117,655 tons, an increase of 6320 tons.

Buffalo—The trade does not improve much. Iron ore comes in slowly by lake and the furnaces are running on slow time. Reports of improvement are not confirmed. Prices remain at $7.25 to $7.50 for 72-hour Connellsville foundry, $6.60 for 48-hour furnace and $6.10 for off grades. Some bituminous shippers are selling crushed sizes for fuel at about foundry prices. They report no sale for breeze coke.

Middle Western

GENERAL REVIEW

All branches of Middle West coal industry not so optimistic. Screenings piling up. Intimation that Government control of coal may again be inaugurated. Large consolidation in Franklin county field.

Operators and jobbers alike report a decrease in business for the weekly period just ended. This lessening of the current demand appears to be general, as practically all of our producing fields are affected, and steam sizes, rather than domestic and railroad egg and lump. The market on screenings is especially weak, and a number of operators have found it well nigh impossible to move their surplus on this size. It is said that one producing field alone has piled in storage over 125,000 tons, as the operators in that district prefer to store their coal rather than sacrifice it on the open market.

One of the reasons for surplus screenings is that considerable lump and egg is moving on railroad orders, and as the operators having railroad shipments must forward coal regularly, it means an accumulation of screenings, which must be moved from day to day. Another reason why the screenings market is weak is because one of the biggest users of steam coal in this territory—public utility people—are still engaged in burning coal they have had in storage. As a result of the conditions mentioned, the screenings market has had a bad week, Southern Illinois 2 in. screenings selling as low as $1.75 mines, and good Indiana screenings as low as $1.50 or perhaps in some cases even less.

The market on prepared sizes—for instance, either lump, egg or nut—continues strong; in fact many producers are behind on their orders. This scarcity on prepared coal is because of recent railroad purchases, as well as a strong demand on the part of the retailers for domestic coal.

Dr. Garfield, in a speech on the Pacific Coast, advised the public that the coal industry would soon be back under Federal control. This came rather as a surprise to the operators, and we believe an unwelcome one, as a whole. The operators feel that the Government restricted them perhaps too closely when there was an opportunity to show a profit, and then, when a chance came for the Government to help the industry, in the railroad matter, for instance, the operators were left high and dry, to shift for themselves.

The coal trade was not surprised to learn that another big consolidation had taken place in the Franklin County, Ill., field. It seems that the Chicago, Wilmington and Franklin Coal Co. has taken over both the Hart Williams mine and the Pyrolite mine, each located in the vicinity of Benton. There is a tendency, especially in Southern Illinois, to merge interests, and place most of the coal properties in strong hands. These developments are perfectly logical, and meet with general approval, as it means a saving to the public. Take for example selling costs. Formerly, each mine in the Franklin County district maintained at least two sales offices, say one in Chicago and another in St. Louis or Minneapolis. As the situation is now, the whole field is represented by three or four large companies, and instead of over a dozen sales offices there are but a third of that number.

The feeling expressed by operators this week is not quite as optimistic as heretofore. The general idea is that screenings and steam coals, with the exception of railroad coal, will continue dull and a problem for at least the next 90 days. Industrial activities have not developed as was predicted, although there are those who predict during the fall and winter months a demand that will prove greater than the supply.

CHICAGO

Better demand for coal and dealers are stocking Eastern coals. Premiums offered for anthracite shipments.

The "Buy your coal early" campaign started by local papers and local coal men a few weeks ago is already beginning to show results. Operators and jobbers from all of the producing fields report a strong domestic demand from Chicago. The steam market continues to lag with small hope of any immediate betterment.

Strange to say, some of our local retailers appear to have profited by the distressing conditions they have been forced to undergo during the past two years. We are glad to say that a few of the more up-to-date and aggressive dealers are now stocking coal. Of course, they are stocking Eastern coal—anthracite, Pocahontas and eastern Kentucky at this time—but they soon will begin laying in a reserve supply of high-grade domestic coal from our own fields in Illinois and Indiana.

The householder is also showing signs of interest, and local retailers report a decided betterment in current orders. Anthracite is in such demand that dealers are offering independent operators 25c. per ton or more premium on prompt shipments.

MILWAUKEE

Coal rules quiet and steady, and dealers report increasing deliveries. Receipts by lake continue liberal.

Coal dealers in Milwaukee report a quiet market, with slightly increasing business. The June advance of 10c. per ton on all grades of anthracite except buckwheat is being publicly protested, and the Milwaukee Association of Commerce, an organization representing every business interest in the city, announces that it will vigorously oppose any further increase in the price of coal, on the ground that it is sufficiently high now and that Milwaukee, with excellent water transportation facilities, should not be compelled to pay exorbitant rates for this class of fuel.

Large users of Illinois and Indiana coal during the war period are gradually getting back to the eastern product. The Central Coal Co., which handled Illinois coal exclusively for the past three years, has put in nearly 75,000 tons of eastern bituminous thus far this season.

Coal is arriving freely by lake, the volume received thus far since the opening of navigation being considerably in excess of last year's record. Up to date 186,153 tons of anthracite and 892,506 tons of bituminous coal have been handled over the docks, as against 124,061 tons of the former and 531,480 tons of the latter during the same period last year.

The City of Milwaukee is advertising for bids on 60,000 tons of coal for public institutions during the coming winter.

ST. LOUIS

Situation remains quiet and the expected call for coal the middle of June has not as yet materialized. Coal in the Standard district still going below cost and no demand for either steam or domestic. In the high-grade field domestic is moving fairly well, while steam sizes are blocking the mine.

The situation is not what it was expected it would be by this time, though conditions are somewhat better. The public still seems to expect a reduction in the price of coal despite reports that the country is behind in its tonnage.

Locally there is a little anthracite and smokeless domestic moving. On the other kinds of fuel there is nothing coming in to speak of, except a little coal from the Standard and Mt. Olive fields. Coke is a drug on the market, except that which is being put in storage by the dealers. There is some threshing coal moving, but not the tonnage that was expected.

Steam locally is at a standstill, and the same condition prevails in the country districts. There is nothing at all to warrant any improvement unless something out of the ordinary happens in connection with the domestic business.

In the Standard district some little coal is moving into St. Louis for steam. Most of the tonnage is going to railroads and some to Chicago. The Chicago tonnage is extremely light and the condition in this field is deplorable at this time, with coal selling below cost and no market for it.

In the Mt. Olive field conditions are considerably better. Some railroad coal moves here and the bulk of the tonnage moves to Chicago and the Northwest.

In the Carterville field of Williamson and Franklin County, as well as in the Du Quoin field in Perry County, the situation is not all that it could be. Steam sizes are long and in some instances the mines are shut down on account of screenings and the smaller sizes of steam coal. Many mines still continue to pile screenings and steam sizes on the ground. Some of the mines are not working at all, and others are only on half time. The car supply is good and transportation is standing up well.

Coal and Coke Securities

New York Stock Exchange Closing Quotations June 16, 1919

STOCKS	Ticker Abvn.	Bid	Asked
American Coal Co. of Allegheny	(ACL)	46	...
Burns Brothers, Com.	(BB)	46	148
Burns Brothers, Pfd.	(BB)	99½	100
Central Coal & Coke, Com.	(CK)	55	....
Central Coal & Coke, Pfd.	(CK)	63	...
Colorado Fuel & Iron, Com.	(CF)	44¼	45
Colorado Fuel & Iron, Pfd.	(CF)	103	125
Consolidation Coal of Maryland	(CGM)	75	...
Elk Horn Coal, Com.	(EH)	32	34
Elk Horn Coal, Pfd.	(EH)	...	47
Island Creek Coal, Com.	(ICR)	39	...
Island Creek Coal, Pfd.	(ICR)	75	...
Jefferson & Clearfield Coal & Iron, Pfd.	(JF)	60	...
New Central Coal of West Va.	(NCC)	5	...
Pittsburgh Coal, Com.	(PC)	60½	61
Pittsburgh Coal, Pfd.	(PC)	92½	93½
Pond Creek Coal	(PD)	17	19
Virginia Iron, Coal & Coke	(VK)	66	70

BONDS	Bid	Asked
Cahaba Coal, 1st Gtd. 6s, 1922	90	...
Clearfield Bituminous Coal, 1st 4s, Ser. A, 1940	71	...
Colorado Fuel & Iron, Gen. 5s, 1943	91	...
Colorado Indus. 1st Mtg. & Col. Tr. 5s, 1934	78	80
Consolidation Coal of Maryland, 1st Ref. 5s, 1950	87	95
Jefferson & Clearfield Coal & Iron, Sec. Mort. 5s, 1926	96	...
Lehigh Valley Coal, 1st Gtd. 5s, 1933	99¼	100¼
—ehigh Valley Coal, Gtd. Int. Red. to 4%, 1913	79⅞	...
Lehigh Val. Coal & Nav. Con. S. F., 4½s, Ser. A, 1954	90	...
Pleasant Valley Coal, 1st S. F., 5s, 1928	80½	...
Pocahontas Coal & Coke, Joint 4s, 1941	84	85
Pocahontas Con. Collieries, 1st S. F. 5s, 1957	86	47½
Roch. & Pitts. Coal & Ir., Helvetia Pur. Money 5s, 1946	98	...
St. L., Rocky Mnt. & Pac. Stamped 5s, 1955	....	81
Tenn. Coal, Iron & R.R., Gen. 5s, 1951	93	94
Utah Fuel, 1st Sinking Fund 5s, 1931	87	...
Victor Fuel, 1st Mtg. Sinking Fund 5s, 1953	55	70
Virginia Iron, Coal & Coke 1st 5s, 1949	85½	88½